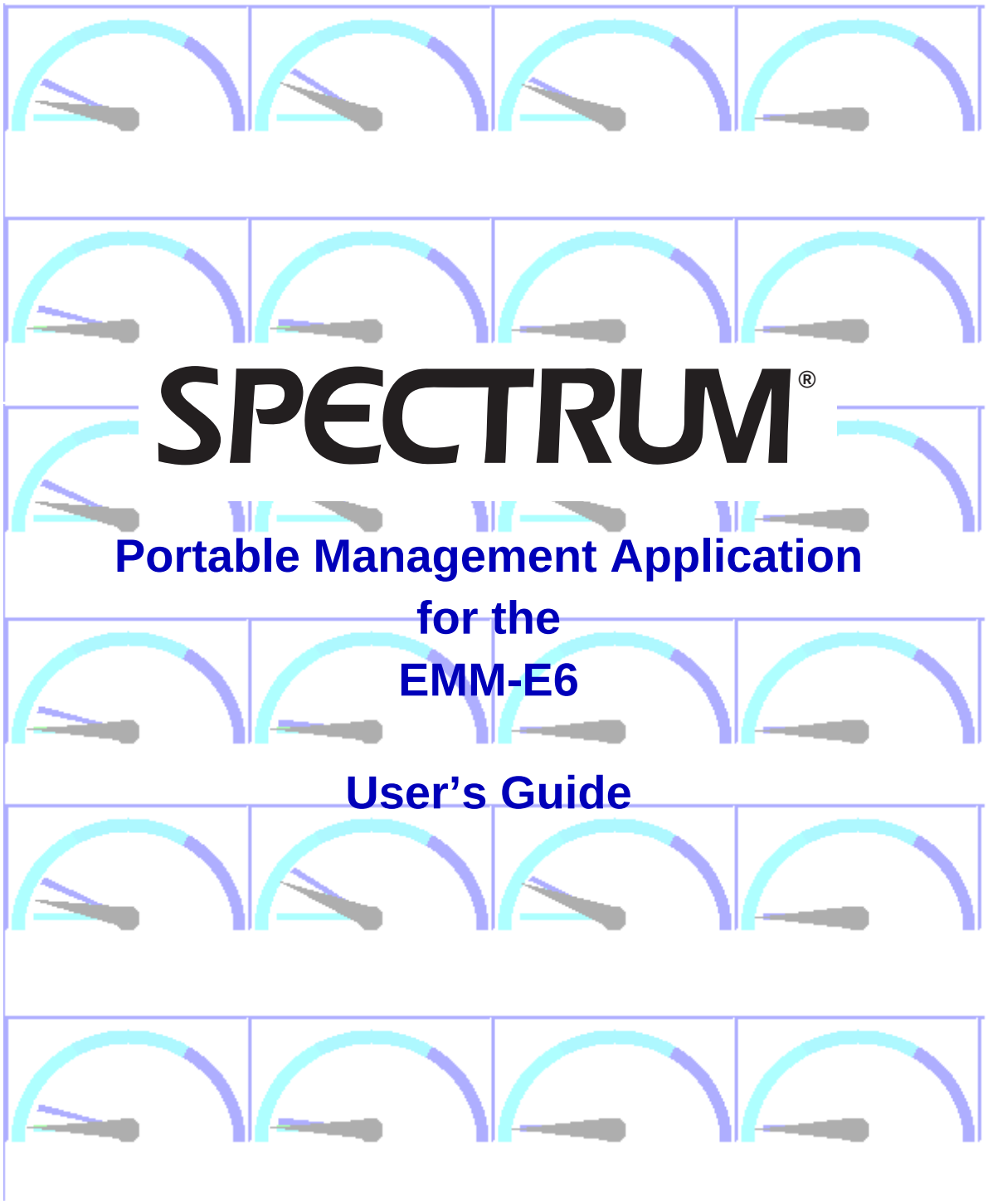

SPECTRUM®

Portable Management Application for the EMM-E6

User's Guide

CABLETRON SYSTEMS

The Complete Networking Solution™

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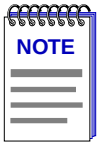
Chapter 1

Introduction

How to use the EMM-E6 User's Guide; manual conventions; contacting the Cabletron Systems Global Call Center; EMM-E6 firmware versions supported by SPMA

The EMM-E6 (Ethernet Management Module for Ethernet with six ports) provides intelligence for Cabletron Systems' Multi-Media Access Center (MMAC) hubs. The EMM-E6 is designed to work with the repeater MIM family of media interface modules (FORMIM, CXRMIM, TPRMIM, and TPXMIM) to take full advantage of the MMAC Flexible Network Bus (FNB). The EMM-E6 uses the dedicated Ethernet channel (channel A) on the MMAC backplane and creates two more Ethernet channels (B and C) using the FNB, then bridges among these three interfaces, as well as a fourth channel (D) provided by a set of redundant EPIM ports located on its front panel. Fifth and sixth channels are provided by optional BRIM modules, also installed on the front panel, which support cross-platform bridging and routing. The EMM-E6 also provides management and serves as a repeater for older MIMs that are not part of the repeater MIM family.



Although the Hub View window displays the presence and general status (on or off) of any installed BRIM modules, you cannot perform any management of BRIM ports from the Hub View application. The functions associated with any BRIM modules installed in your EMM-E6 can be configured and managed via the SPMA BRIM Launcher application; the BRIM Launcher is described in the ***SPMA BRIM User's Guide****.*

Using the EMM-E6 User's Guide

Your SPECTRUM Portable Management Application (SPMA) for the EMM-E6 consists of a number of different applications, each of which provides a portion of the overall management functionality. Each of these applications can be accessed from the icon menu (if you are using a management platform) and from the

Stand-alone Launcher or the command line (if you are running in stand-alone mode); in addition, several applications can also be accessed from within the Hub View, a graphical display of the EMM-E6 and the hub it is managing.

The EMM-E6 ***User's Guide*** describes how to use many of the applications included with the module; note that the instructions provided in this guide apply to the EMM-E6 module regardless of the operating system or management platform you are using. Instructions for launching each individual function from the command line (stand-alone mode) are also included in each chapter.

Following is a description of the applications covered in this guide; while we provide as much background information as we can, we do assume that you're familiar with Ethernet networks and general network management concepts:

- Chapter 1, **Introduction**, provides a list of related documentation, describes certain software conventions, and shows you how to contact the Cabletron Systems Global Call Center.
- Chapter 2, **Using the EMM-E6 Hub View**, describes the visual display of the Hub and explains how to use the mouse within the Hub View; the operation of some basic functions (changing the Hub View display, opening menus and windows, enabling and disabling ports, checking device and module status, and so on) available only from within the Hub View is also described. You can access the Hub View application from the icon menu or the command line.
- Chapter 3, **Alarm Configuration**, describes how to set thresholds and enable or disable alarms at the network (channel), module, and port levels. You can access the Alarm Configuration application from the icon menu, the Hub View, or the command line.
- Chapter 4, **Link/Seg Traps**, describes how to configure link and segmentation traps to suit your management needs. You can access the Link / Seg Traps application from the icon menu, the Hub View, or the command line.
- Chapter 5, **Redundancy**, describes how to configure redundant circuits to keep your network connections up and running in the event of a single port's failure. You can access the Redundancy application from the icon menu, the Hub View, or the command line.
- Chapter 6, **Source Addressing**, describes how to display the Source Address List, how to set the ageing time, and how to configure source address traps; it also discusses the effects of source address locking. You can access the Source Address application from the icon menu, the Hub View, or the command line.
- Chapter 7, **Security**, describes how to configure intruder protection for all MIMs installed in the EMM-E6-controlled hub, and how to configure eavesdropper protection for any installed *LANVIEW* SECURE MIMs. You can access the Security application from the icon menu, the Hub View, or the command line.

- Chapter 8, **Front Panel Redundancy**, describes how to configure redundancy for the two Channel D EPIM ports on the EMM-E6's front panel. You can access the Front Panel Redundancy application from the icon menu, the Hub View, or the command line.
- Appendix A, **EMM-E6 MIB Components**, lists the IETF MIBs supported by the EMM-E6, and describes their arrangement in a series of MIB components. A description of the objects controlled by each component is also included.

What's NOT in the EMM-E6 User's Guide. . .

The following standard SPMA tools are available through the EMM-E6 module and are explained in the ***SPECTRUM Portable Management Application Tools Guide***:

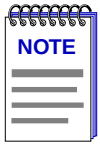
- Bridge View
- Charts, Graphs, and Meters
- Community Names
- Distributed LAN Monitor (DLM)
- MIB I, II
- MIBTree
- Path
- Telnet
- TFTP Download
- Trap Table
- UPS
- Utilities (Global Community Names, Find MAC Address and TFTP)

Charts, Graphs, and Meters are accessible from the Hub View and the command line; the Utilities, MIBTree, and RMON Configuration applications are accessible from the platform console window Tools menu, the Stand-alone Launcher applications menu, or the command line; and the rest of the tool applications (except Telnet) are available from the icon menu, the Hub View, or the command line. (The Telnet application is available only from the icon menu or the command line.)

An additional application may also appear on the platform console window Tools menu or the Stand-alone Launcher applications menu:

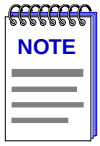
- RMON Configuration

Note that this application must be purchased separately, and is documented in its own ***User's Guide***.



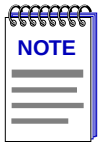
If you are using SPMA in a stand-alone mode or in conjunction with the SunNet Manager or Solstice Enterprise Manager platforms, the RMON option will be available for all appropriate devices whether or not you have purchased the RMON application module. If you are using SPMA in conjunction with HP Network Node Manager or IBM NetView, however, the RMON option will only appear when the module has been purchased and installed.

Instructions on discovering Cabletron devices, creating icons, and accessing the icon menus within your management platform are included in your ***Installing and Using SPECTRUM for...*** guide. If you are using SPMA for the EMM-E6 in stand-alone mode — that is, without benefit of a specific network management system — instructions for starting each application from the command line are included in each chapter of this guide and the ***SPMA Tools Guide***.



Graphing capabilities are provided by an application that is included in HP Network Node Manager and IBM NetView; therefore, graphs are only available when SPMA is run in conjunction with one of these network management platforms. If you are running SPMA in a stand-alone mode or in conjunction with SunNet Manager or Solstice Enterprise Manager, no graphing capabilities are available and no graph-related options will be displayed on buttons or menus. Note that the screens displayed in this guide will include the graph-related options where they are available; please disregard these references if they do not apply.

Also available from the icon menu or the command line is the option which provides access to BRIM-related applications and two options which provide access to router-related applications: the **BRIM** option is described in the ***SPMA BRIM Applications User's Guide***; the **Basic Router Config**, and **Advanced Router Config**, options are described in documentation shipped with your order of routing applications, which must be purchased separately.



Please note that the routing functionality for your EMM-E6, as well as the SPMA management modules that allow you to configure and manage that functionality, must be purchased separately. Contact the Cabletron Systems Global Call Center or your local sales representative for more information.

Conventions

SPECTRUM Portable Management Applications — including the EMM-E6 module — can work with a number of different network management systems running on several different operating systems and graphical user interfaces. This versatility presents two documentation problems: first, there is no standard terminology; and second, the appearance of the windows will differ based on the

graphical interface in use. For the sake of consistency, the following conventions will be followed throughout this and other SPMA guides.

Screen Displays

SPMA runs under a variety of different operating systems and graphical user interfaces. To maintain a consistent presentation, screen displays in this and other SPMA guides show an OSF / Motif environment. If you're used to a different GUI, don't worry; the differences are minor. Buttons, boxes, borders, and menus displayed on your screen may look a bit different from what you see in the guide, but they're organized and labelled the same, located in the same places, and perform the same functions in all screen environments.

Some windows within SPMA applications can be re-sized; those windows will display the standard window resizing handles employed by your windowing system. Re-sizing a window doesn't re-size the information in the window; it just changes the amount of information that can be displayed (see Figure 1-1). When you shrink a window, scroll bars will appear as necessary so that you can scroll to view all the information that is available.

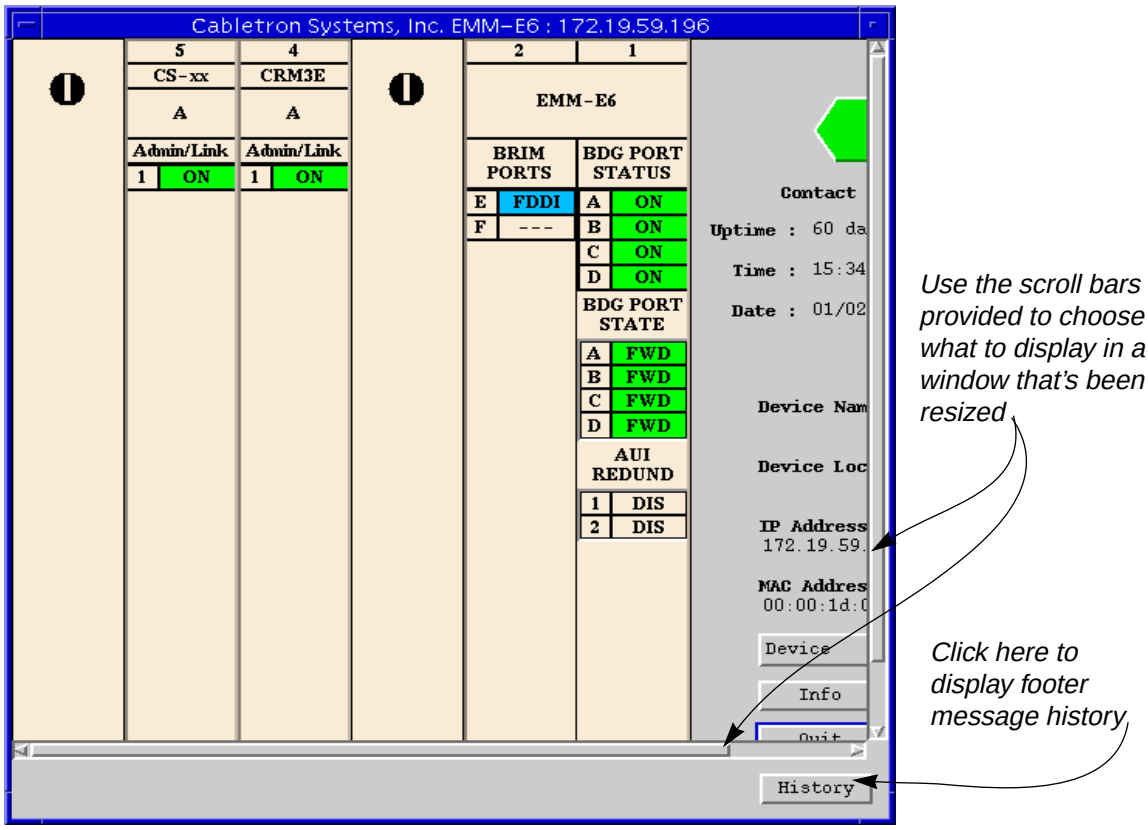


Figure 1-1. Window Conventions

Some windows will also contain a History button; selecting this button launches a History window (Figure 1-2) which lists all footer messages that have been displayed since the window was first invoked. This window can help you keep track of management actions you have taken since launching a management application.

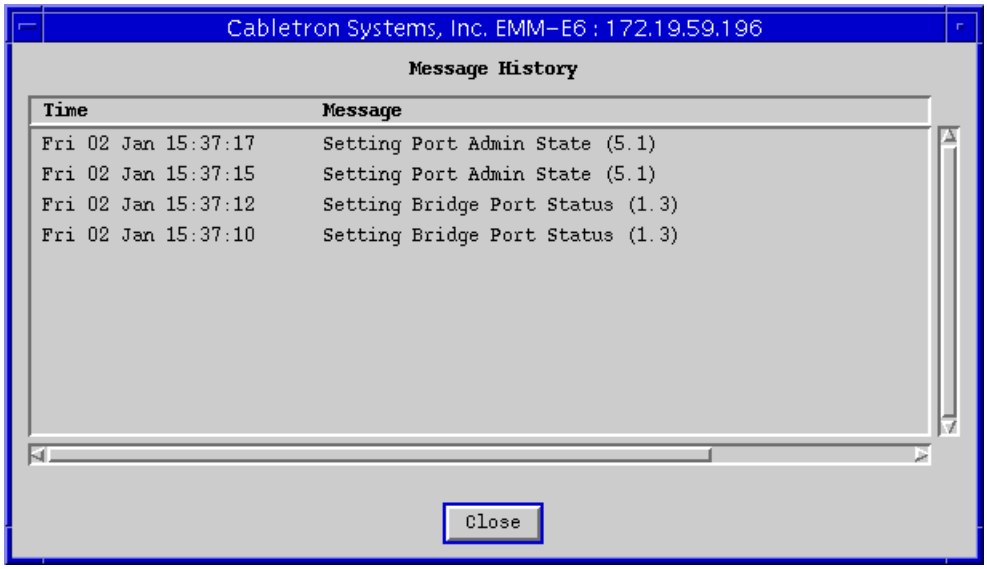


Figure 1-2. The History Window

Using the Mouse

The UNIX mouse has three buttons. Procedures within the SPMA document set refer to these buttons as follows:

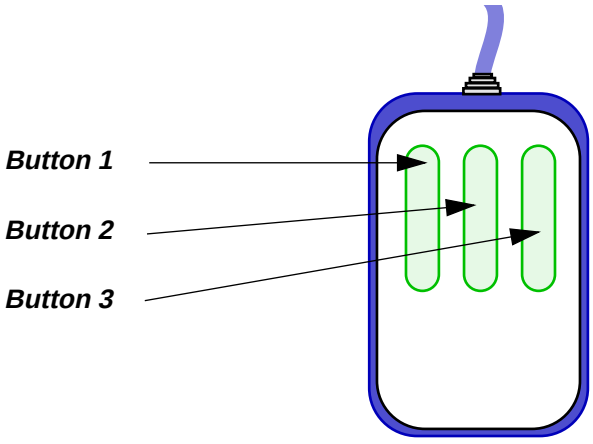


Figure 1-3. Mouse Buttons

If you're using a two-button mouse, don't worry. SPMA doesn't make use of mouse button 2. Just click the left button for button 1 and the right mouse button when instructed to use mouse button 3.

Whenever possible, we will instruct you on which mouse button to employ; however, menu buttons within SPMA applications will operate according to the convention employed by the active windowing system. By convention, menu buttons under the Motif windowing environment are activated by clicking the left mouse button (referred to as mouse button 1 in SPMA documentation), and there is no response to clicking the right button (mouse button 3). Under OpenWindows, menu buttons can be activated by clicking the right button, and convention dictates that the left button activates a default menu option; within SPMA, that default option will also display the entire menu. Because of this difference, references to activating a menu button will not include instructions about which mouse button to use. All other panels from which menus can be accessed, and all buttons which do not provide access to menus, will operate according to SPMA convention, as documented.

Getting Help

If you need technical support related to SPMA, or if you have any questions, comments, or suggestions related to this manual or any of our products, please feel free to contact the Cabletron Systems Global Call Center. Before calling, please have the following information ready:

- The product name and part number.
- The version number of the program that you need help with. SPMA is modular, which means each application will have a specific revision number. Where applicable, an INFO button provides the version number; you can also view the version number for any application by typing the command to start the application followed by a **-v**.

You can contact the Cabletron Systems Global Call Center via any of the following methods:

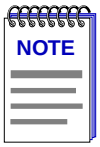
By phone:	Monday through Friday between 8 AM and 8 PM Eastern Standard Time at (603) 332-9400.
By mail:	Cabletron Systems, Inc. PO Box 5005 Rochester, NH 03866-5005
By Internet mail:	support@ctron.com
FTP:	ftp.ctron.com (134.141.197.25)
Login	`anonymous`
Password	`your email address`
By BBS:	(603) 335-3358

Modem Setting 8N1: 8 data bits, 1 stop bit, No parity

For additional information about Cabletron Systems products, visit our World Wide Web site: **http://www.cabletron.com/**. For technical support, select **Service and Support**.

EMM-E6 Firmware

SPMA for the EMM-E6 has been tested against firmware versions 3.22.01; if you have an earlier version of firmware and experience problems running SPMA contact the Cabletron Systems Global Call Center for upgrade information.



As a general rule, firmware versions for new products are liable to change rapidly; contact the Cabletron Systems Global Call Center for upgrade information for the latest customer release of firmware.

Year 2000 Compliance

Previous users of SPMA will note a few display changes related to Year 2000 compliance. All SPMA applications now have the ability to display a four-digit year value where this information is available. For example, the Stand-alone Launcher window — which uses your workstation's system time value to display the time and date of the last contact change — will now display these date values with eight digits (05/31/1998) instead of six (05/31/98).

Please keep in mind, however, that SPMA's ability to *display* a four-digit year value in device-specific windows — such as the Device Status window available from the Hub View or the Bridge View — is dependent on the firmware's ability to *provide* a four-digit value. Not all firmware versions support this ability; contact Cabletron Systems' Global Call Center for information specific to your device firmware.

Chapter 2

Using the EMM-E6 Hub View

Navigating through the Hub View; monitoring hub performance; managing the hub

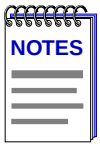
The heart of the SPECTRUM Portable Management Application (SPMA) for the EMM-E6 is the Hub View, a graphical interface that gives you access to many of the functions that provide control over the EMM-E6-managed hub.

Using the Hub View

There are two ways to open the Hub View: if you are working within a network management system, you can select the **Hub View** option from the icon menu; specific directions for creating a EMM-E6 icon and accessing the icon menu can be found in the appropriate ***Installing and Using SPECTRUM for...*** guide. If you are running the EMM-E6 module in a stand-alone mode, type the following at the command line:

```
spmarun emme <IP address> <community name>
```

The community name you use to start the module must have at least **Read** access; for full management functionality, you should use a community name that provides **Read/Write** or **Superuser** access. For more information on community names, consult the appropriate ***Installing and Using SPECTRUM for...*** guide, and/or the **Community Names** chapter in the ***SPMA Tools Guide***.



*The **spmarun** script invoked first in the above command temporarily sets the environment variables SPMA needs to operate; be sure to use this command any time you launch an application from the command line. This script is automatically invoked when you launch an application from the icon menu or from within the Hub View.*

*If there is a hostname mapped to your EMM-E6's IP address, you can use **<hostname>** in place of **<IP address>** to launch the Hub View. Please note, however, that the hostname is **not** the same as the device name which can be assigned via Local Management and/or SPMA; you cannot use the device name in place of the IP address.*

Navigating Through the Hub View

Within the Hub View, you can click mouse buttons in different areas of the window to access various menus and initiate certain management tasks. The following diagrams describe the information displayed in the Hub View and show you how to use the mouse to display the Device, Network, Module, and Port menus.

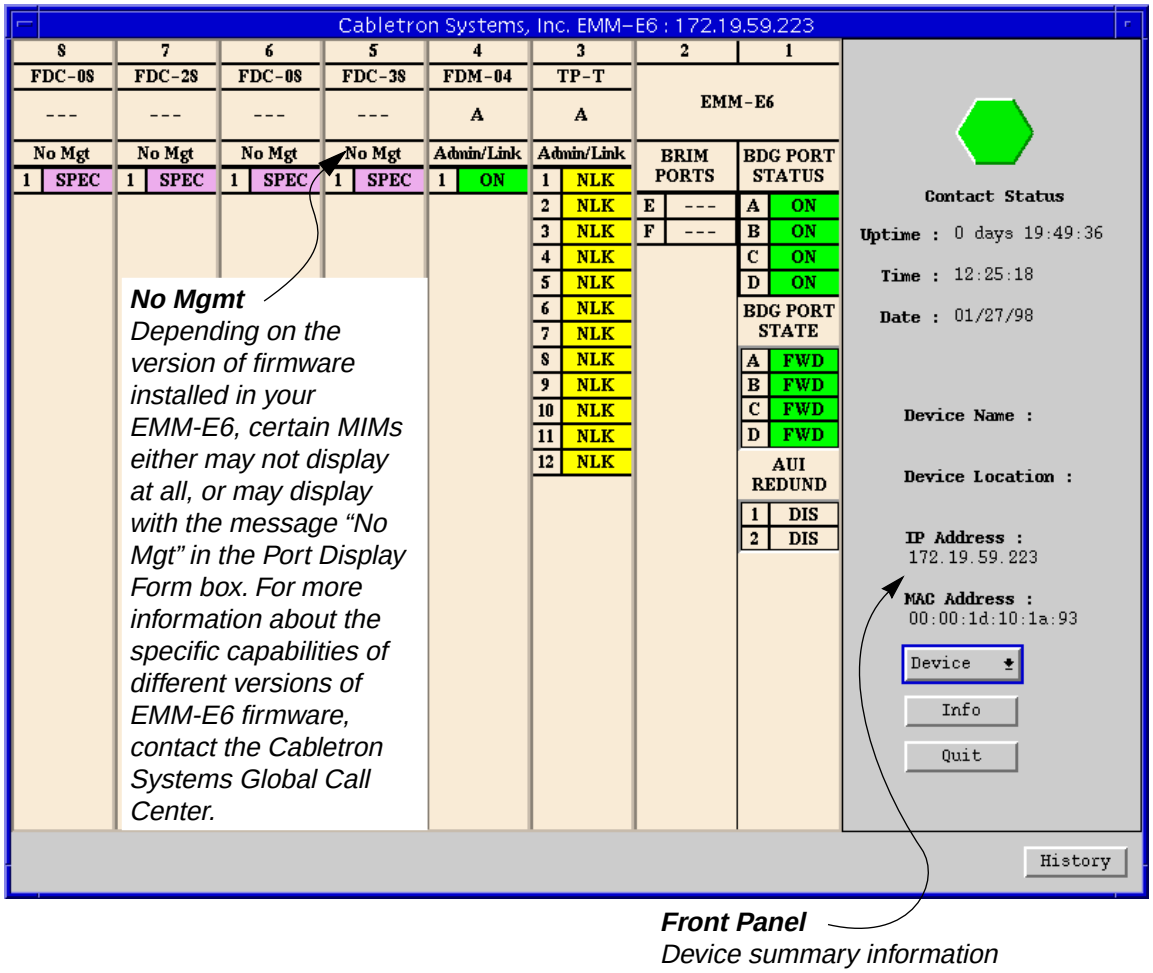


Figure 2-1. EMM-E6 Hub View

Hub View Front Panel

In addition to the graphical display of the modules, the Hub View gives you device level summary information. The following Front Panel information appears to the right of the module display in the Hub View:

Contact Status is a color code that shows the status of the connection between SPMA and the device:

- Green means a valid connection.
- Blue means that SPMA is trying to reach the device but doesn't yet know if the connection will be successful.
- Red means that SPMA is unable to contact or has lost contact with the device.

Uptime

The time that the device has been running without interruption. The counter resets to 0 days 00:00:00 (days HH:MM:SS) when one of the following occurs:

- Power to the device is cycled.
- The device is reset manually.

Date and Time

The date and time are taken from the device's internal clock.

Device Name

A text field that you can use to help identify the device; you can edit the device name via the Device Status window, described on page 2-13.

Device Location

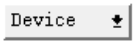
A text field that you can use to help identify the device; you can edit the device location via the Device Status window, described on page 2-13.

IP Address

The device's Internet Protocol address; this field will display the IP address you have used to create the EMM-E6 icon (if you are running the Hub View from a management platform) or the IP address you used to launch the Hub View program (if you are running in stand-alone mode). You cannot change the EMM-E6's IP address from SPMA; however, you can view the MAC addresses of all installed interfaces (up to six), along with any associated IP addresses that have been assigned, by using the **IP Address Table** function described on page 2-19.

MAC Address

The device's factory-set hardware address; this field will display the MAC address associated with the IP address used to define the icon (if you are running the Hub View from a management platform) or the IP address you used to launch the Hub View program (if you are running in stand-alone mode). The MAC addresses cannot be changed.



Clicking the **Device** button displays the Device menu, Figure 2-2.

Figure 2-2. EMM-E6 Hub View Device Menu

The Device menu lets you perform the following:

- Open the Device Status window
- Access the IP Address Table
- Open the Polling Intervals window
- Change the Port Display Form
- Launch the Global Find MAC Address Tool
- Start the Alarm Configuration application
- Start the Link / Seg Traps application
- Start the Repeater Redundancy application
- View the Source Address List
- Access the Security application
- Start the Front Panel Redundancy application

Note that the Device menu does not provide access to every application available to the EMM-E6. Some information is only available from the Network, Module, and / or Port menus, and several applications can only be accessed either from the icon menu (if you are running under a network management platform) or from the command line (if you are running in stand-alone mode). See Chapter 1, **Introduction**, for a complete list of applications available to the EMM-E6 and how to access each one.

Info

If you need to call the Cabletron Systems Global Call Center about a problem with the Hub View application, you'll need the information provided in the Info window:

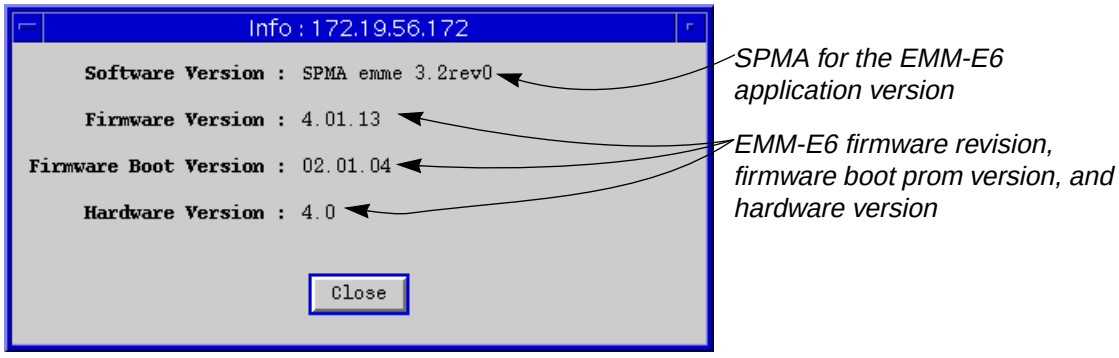


Figure 2-3. Hub Information Window

Quit

Clicking mouse button 1 on the **Quit** button closes all Hub View application windows; any open applications which can also be accessed from the command line or from the icon menu will remain open.

EMM-E6 Ports Display

The EMM-E6 module display in the Hub View shows the device's first four channels in two different modes: their Bridge Port Status (ON or OFF), and their Bridge Port State (Listening, Learning, Forwarding, Blocking, or Disabled). Status displays are color coded green for ON, blue for OFF; state displays are color coded yellow for Listening and Learning, green for Forwarding, red for Blocking, and blue for Disabled. The current redundancy status (Active or Inactive) of the Channel D EPIM ports is also displayed. BRIM ports E and F will display status colors (green for ON, blue for OFF) for any installed BRIM modules, along with the BRIM type (FDDI, WAN, TR, ATM, or ENET).

NOTE

Although the Hub View displays the presence and general status (ON or OFF) of any installed BRIM modules, you cannot enable or disable these ports from the Hub View. To manage any installed BRIMs, launch the Bridge application from the Device menu, or launch any other application available for your BRIM from the BRIM Launcher application; see ***Chapter 1*** *for more information on how to access BRIM-specific management.*

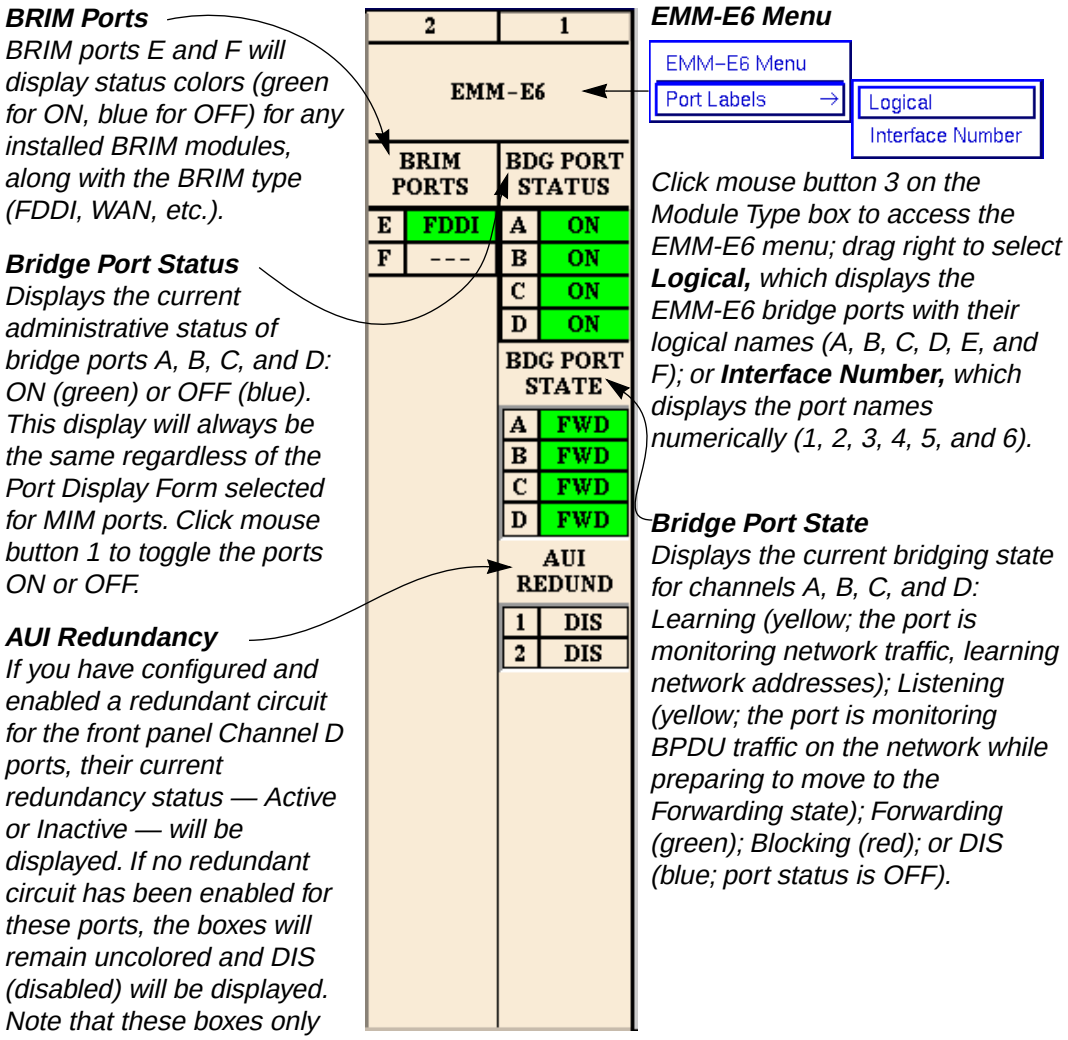


Figure 2-4. EMM-E6 Ports

Using the Mouse in a Hub View Module

Each media interface module, or MIM, installed in the EMM-E6-controlled hub will be displayed in the hub view; use the mouse as indicated in the illustration below to access Network, Module, and Port menus and functions.

NOTE

Depending on the version of firmware installed in your EMM-E6, certain MIMs either may not display at all, or may display with the message "No Mgt" in the Port Display Form box. For more information about the specific capabilities of different versions of EMM-E6 firmware, contact the Cabletron Systems Global Call Center.

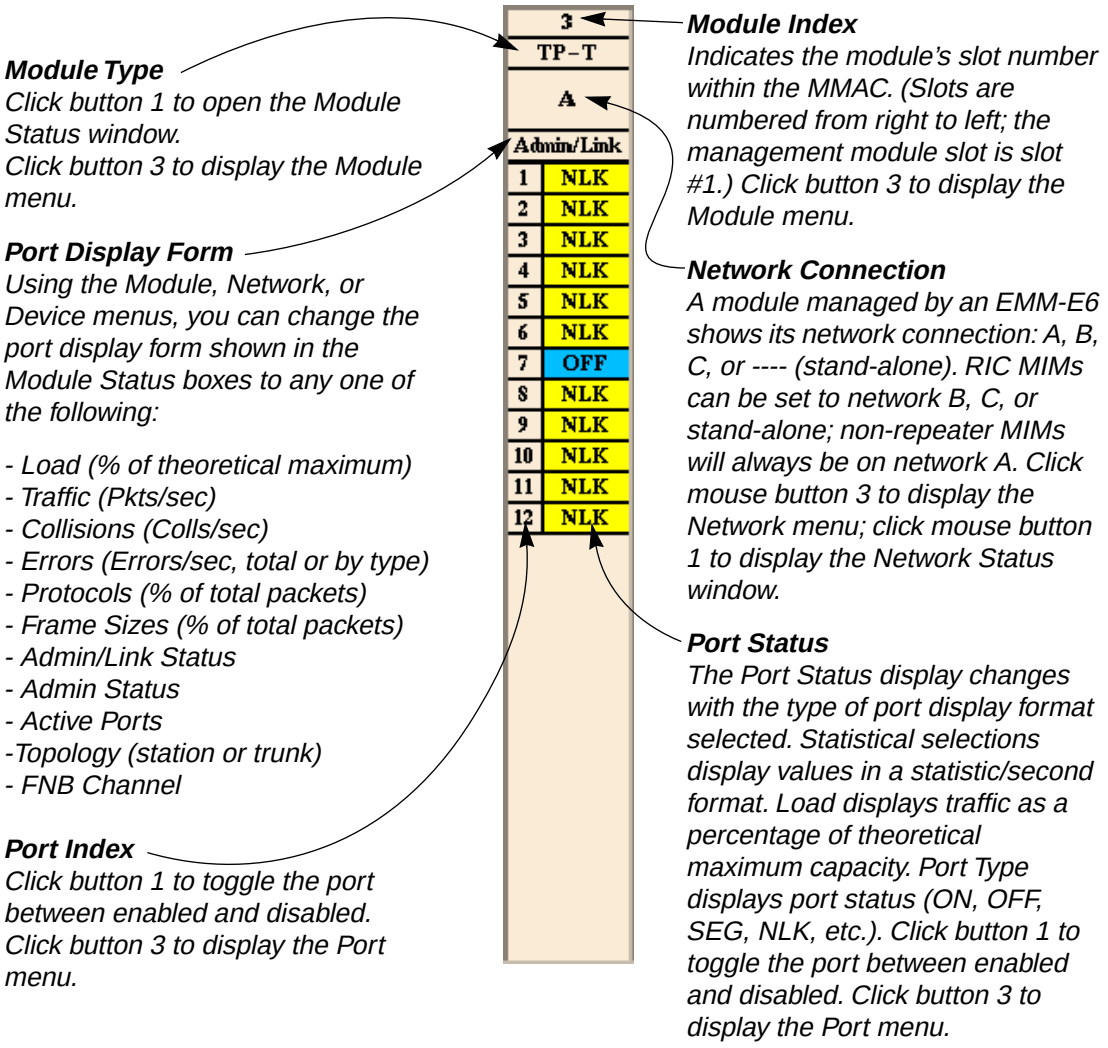


Figure 2-5. Mousing Around a Module Display

Hub View Port Color Codes

The Port Status boxes in the Hub View are color coded to indicate the port's connection status. The colors are consistent for all Port Display Forms except Admin Status and FNB Channel; the exceptions are noted below.

- **Green** indicates that the port is active; that is, the port has been enabled by management, has a valid Link signal (if applicable), and is able to communicate with the station at the other end of the port's cable segment. Note that an AUI or transceiver port will display as active as long as it has been enabled by management, even if no cable is connected.
- **Blue** indicates that the port has been disabled through management.
- **Yellow** indicates that the port is enabled but does not currently have a valid connection. This usually indicates that the device at the other end of the segment is turned off, or that there is no cable attached.
- **Red** indicates that the port is enabled, but is not able to pass packets. This generally means that the port has been segmented by management after experiencing an excessive number of collisions; for a BNC (thin coax) port, however, this may only mean that no cable or terminator has been connected.
- **Magenta** indicates that the EMM-E6 can't manage the device.

When the **Admin Status** port display option is active, only two colors apply: a port will be displayed in green if it is enabled by management, regardless of whether or not there is a cable attached or a valid link signal detected; a port disabled by management will display as blue.

When the **FNB Channel** option is active, an entirely different color scheme is employed: salmon = Channel A; light blue = Channel B; orange = Channel C, and grey = stand-alone.

Monitoring Hub Performance

The information displayed in the Hub View can give you a quick summary of device activity, status, and configuration. SPMA can also provide further details about hub performance via its four-level menu structure. The Device, Network, Module, and Port menus (Figure 2-6, below) give you control over the hub at four levels and give you access to the tools, menus, and windows that let you monitor specific aspects of hub performance, change hub display options, and set EMM-E6 operating and notification parameters. Remember, though many functions will operate the same at each level, those accessed via the Device menu control or provide information about all modules in the hub; those accessed via the Network menu control or provide information about all modules in a particular network, or channel; those accessed via the Module menu control or provide information about a single module; and those accessed via the Port menu control or provide information about a single port.

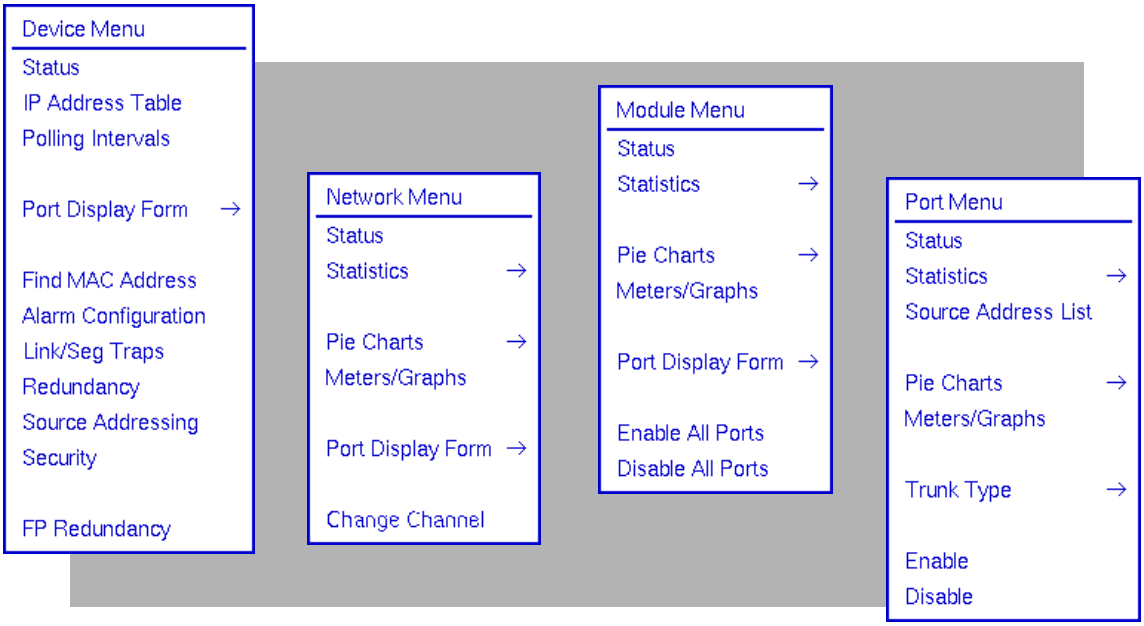
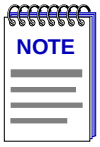


Figure 2-6. The EMM-E6's Device, Network, Module, and Port Menus

Hub performance data available through these menus includes:

- Device, Network, Module, and Port status descriptions.
- Network, Module, and Port statistics, which provide a complete breakdown of packet activity.
- Network-, Module-, and Port-level pie charts, graphs, and meters, for a graphic representation of the types and levels of traffic passing through the hub. (For more information about pie charts, graphs, and meters, see the **Charts, Graphs, and Meters** chapter in the ***SPMA Tools Guide***.)



Graphing capabilities are provided by an application that is included in HP Network Node Manager and IBM NetView; therefore, graphs are only available when SPMA is run in conjunction with one of these network management platforms. If you are running SPMA in a stand-alone mode or in conjunction with SunNet Manager or Solstice Enterprise Manager, no graphing capabilities are available and no graph-related options will be displayed on buttons or menus. Note that the screens displayed in this guide will include the graph-related options where they are available; please disregard these references if they do not apply.

Port Display Form

You can change the type of information displayed for each port in the hub by using the Port Display Form option on the Device, Network, and Module menus.

Changing the port display form via the Device menu will affect all manageable ports in the hub; using the Network menu will affect all ports on a specific channel, or network; and using the Module menu will affect all ports on the appropriate module.

If there is a TPXMIM in multi-channel mode installed in your EMM-E6-managed hub, the Port Display Form option will not be available from that MIM's Network menu; in addition, a TPXMIM in multi-channel mode will not respond to changes in Port Display Form made via any other MIM's Network menu. However, the TPXMIM will always respond to changes in port display form initiated via the Module or Device menus.

For more information about the TPXMIM and its multi-channel capabilities, see ***Configuring TPXMIM Connections****, page 2-30.*

To change the port display form:

1. Click in the appropriate area to display the Device, Network, or Module menu (refer to Figure 2-5, page 2-7).
2. Drag down to **Port Display Form**, then right as necessary to select one of the port display options. The current selection will be displayed in the Port Display Form text box(es) on the module displays.

Port display form options are:

Load
Shows a percentage for each active port that represents that port's portion of the theoretical maximum traffic level — for Ethernet networks, 10 megabits per second.

Traffic
Displays port traffic data in a packets / second format.

Collisions
Displays port traffic data in a collisions / second format. The EMM-E6 counts both **receive** collisions — those collisions it detects while receiving a transmission — and **transmit** collisions —those it detects while transmitting (i.e., the EMM-E6 transmitted one of the colliding packets); however, those counts are combined and a single total value is displayed.

Errors
Shows port traffic errors in an errors / second format. You can display any one of the following types of errors:

- Total errors
- Alignment errors
- CRC (Cyclic Redundancy Check) errors
- Runts
- Giants

- OOW (Out-of-Window) Collisions

For error type descriptions, see **Checking Statistics** on page 2-20.

Protocols

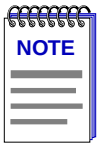
Displays a percentage for each active port that represents what portion of that port's traffic is of a particular protocol type. You can display any one of the following protocol types:

- IP
- OSI
- XNS
- DECNet
- Novell
- Appletalk
- Banyan
- Cabletron
- Other

Frame Sizes

Displays a percentage for each active port that represents what portion of that port's traffic is of a specific size, measured in bytes. You can display any one of the following frame sizes:

- Runts (packets with fewer than 64 bytes)
- 64-127
- 128-255
- 256-511
- 512-1023
- 1024-1518
- Giants (packets with more than 1518 bytes)



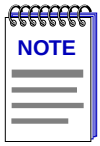
For the statistical port display form options listed above, three dashes (---) will display for all inactive ports; any active (green) port will display a numeric value, even if it's 0.0000.

Port Type

Provides the following administrative information about the port:

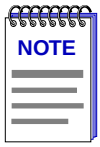
- **Admin/Link Status** indicates the connection status of the port:
  - ON indicates that the port has a valid link signal or does not support a link signal.
  - OFF indicates that the port has been turned off through management action.
  - NLK (No Link) indicates that the port does not have a link to a device at the other end of the cable, or that there is no cable attached.

- SEG (Segmented) indicates that the port has been segmented by the repeater due to an excessive collision level.



Because BNC thin coax, AUI, and transceiver ports do not support the link feature, the displayed Admin/Link status for those ports may be misleading: for example, a BNC port will display as segmented when, in fact, there is no cable or terminator attached or the cable has been disconnected; and AUI or transceiver port will display as on (with a valid link signal) even when no cable is attached. Be sure to keep these anomalies in mind when troubleshooting a hub so equipped.

- **Admin Status** displays either ON or OFF, an indication of whether management has the port enabled or disabled. A port can be ON but not operational; for example, under the Admin display, ports that are segmented or not linked are shown as ON.
- **Active Ports** displays either YES or NO for any active (green) port, indicating whether or not that port has seen any traffic at all since the device was last initialized; this port display form can tell you whether any port whose statistics are not currently incrementing has seen some activity in the past. Non-green (presumably inactive) ports will display three dashes (---), regardless of their past statistical activity.
- **Topology** displays either TRUNK or STN (station), a status which is defined by how many source addresses are communicating through that port at any given moment: if zero, one, or two addresses are communicating, the port is considered to be a station port; if more than two addresses are communicating, the port is considered to be a trunk port. See **Setting a Port's Trunk Type**, page 2-32, for more information.



*If you use the Trunk Type option on the Port menu to manually change a port's topology status from Force Trunk to Not Forced, any status change from trunk to station will not be reflected in the port display until the current cycle of the Source Address timer is complete. See Chapter 6, **Source Addressing**, for more information on the timer.*

*Older versions of EMM-E6 firmware (previous to revision level 2.00.16) use slightly different definitions of station and trunk status: station ports are defined as those which are detecting no source addresses or only a single source address; trunk ports are those detecting **two** or more. If you have any questions about which definition your version of firmware employs, or if you would like information about upgrading your EMM-E6 firmware, contact the Cabletron Systems Global Call Center. Also, see Chapter 6, **Source Addressing**, and Chapter 7, **Security,** for more information about station and trunk status.*

- **FNB Channel** displays a letter which indicates each port's current channel assignment: A, B, C, or SA (stand-alone).

Checking Device Status and Updating Front Panel Info

The Device Status window is where you change the information displayed on the Hub View Front Panel and where you can see summary information about the current state of the hub.

To open the Device Status window:

1. Click on Device to display the Device menu.
2. Drag down to **Status** and release.

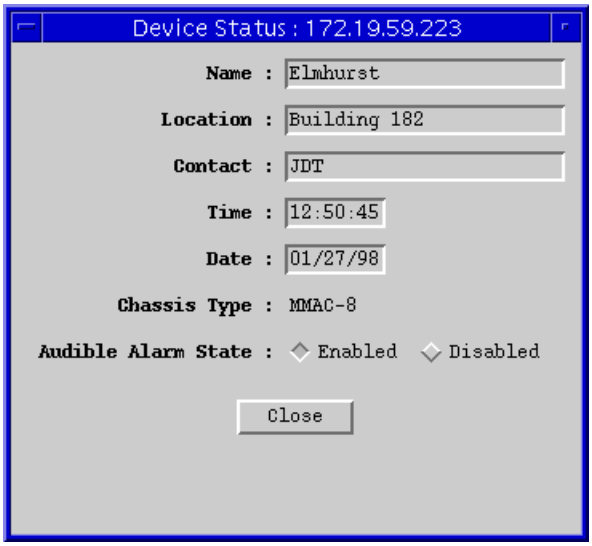
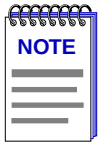


Figure 2-7. EMM-E6 Device Status Window

Name and **Location**
These text fields help identify this EMM-E6. The information you enter in the Name and Location boxes is written to the EMM-E6's MIB and appears on the Hub View front panel.

Contact
Use the Contact box to record the name and phone number of the person responsible for the device. Note that the information entered here is ***not*** displayed on the Hub View front panel.

Date and **Time**
Displays the current date and time from the EMM-E6's internal clock. Although the fields are static in the window, the front panel display is a real-time presentation.



If your device firmware can accept four-digit year values, the Date field will allow you to enter the year portion in one-, two-, or four-digit format. If you choose to enter one or two digits for the year, any value greater than or equal to 88 will be presumed to be in the 1900s; a value of 87 or less is presumed to be in the 2000s. No matter which entry format you choose, the year will still be displayed and set as a four-digit value.

If your device firmware cannot accept four-digit year values, the Date field will allow you to enter the year portion in one- or two-digit format (with leading zeros supplied automatically for single-digit entries). No presumption is made about the century, and any two-digit year value (from 00 to 99) will be accepted.

Attempts to set the date may result in one of three different error messages. Two of these messages will indicate that the wrong number of digits has been used for the year value, and will indicate the appropriate number of digits to use for the selected device; the third message will indicate that the entered date is invalid because it is not an actual calendar date (such as 02/29 in a non-leap year, any month value greater than 12, or any day value greater than 31).

Chassis Type
Indicates the type of hub that houses this EMM-E6 — MMAC-M3FNB, MMAC-M5FNB, and so forth — and whether or not the hub contains a shunting backplane.

To change the name, location, contact, date, or time:

1. Highlight the appropriate field and type the new values.
2. Press **Enter** or **Return** on the keyboard to save each change before moving on to another; each change will appear on the front panel as soon as **Enter** or **Return** is pressed.

The Device Status window also allows you to enable or disable the audible chassis alarm for your chassis. When the chassis alarm is enabled, an alarm will sound when high temperature or low voltage conditions occur in the chassis. To enable or disable the chassis alarm:

1. In the **Audible Alarm State** field, click on the **Enabled** or **Disabled** option, as desired. The chassis alarm will be enabled or disabled, as selected.

Checking Network Status

The Network Status window provides information about each active repeating network, or channel, on the EMM-E6.

To access the Network Status window:

1. Click mouse button 1 in the appropriate Network Connection box (one displaying the letter that identifies the network you are interested in: A, B, or C).

or

Click mouse button 3 on the appropriate Network Connection box to open the Network menu.

2. Drag down to **Status** and release.

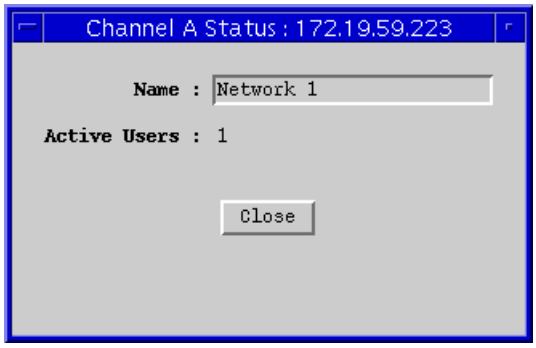


Figure 2-8. EMM-E6 Network Status window

Note that the information in the Network Status window applies to all MIMs connected to the selected channel, regardless of which MIM display was used to access the window. The name of the selected channel (A, B, or C) is displayed in the window title. Note that no Network Status window is available for channels D, E, and F, as those channels do not serve as repeaters. Note also that no Network Status window is available for RIC MIMs operating in stand-alone, or isolated mode — that is, those which are not connected to any EMM-E6 channel.

The Network Status window contains the following fields:

Name

This is a text field you can use to help identify this network. For example, if the selected channel connects users in one department, or users on one floor or one area of a building, you can use this field to name the network or channel, accordingly: Accounting, or 3rd Floor Bldg. C. The information entered here is not displayed anywhere else in the Hub View.

To change the network name:

1. Highlight the existing text (if necessary) and type the new name.
2. Press **Enter** or **Return** on the keyboard to save your change.

Active Users

Displays the number of active source addresses that are communicating on this network, or channel.

Checking Module Status

You can open a Module Status window for any manageable module in the EMM-E6-controlled hub. To open the Module Status window:

1. Click button 1 in the Module Type box.

   or

   Click button 3 in the Module Index, Module Type, or Port Display Form box to display the Module menu.

2. Drag down to **Status** and release.

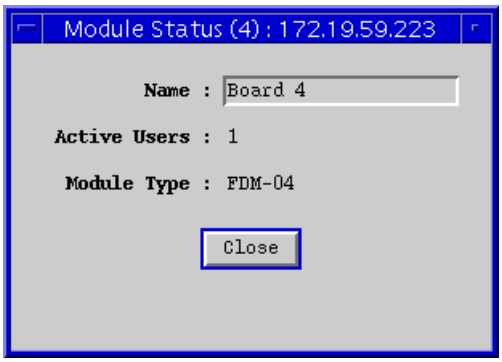


Figure 2-9. EMM-E6 Module Status Window

Note that the window title includes the module number in parentheses; the rest of the window contains the following fields:

Name
This text field can help identify this module; the information entered here does not appear anywhere else in the Hub View.

To edit the Module Name:

1. Highlight the text in the Name box and type in a new name.
2. Press **Enter** or **Return** on the keyboard to save your change.

Active Users
Displays the number of active source addresses communicating through this module.

Module Type
The type of MIM installed in the selected slot — THN, TP-T, CXR, etc. This is the same information as that displayed in the Module Type box on the MIM display.

Checking Port Status

You can open a Port Status window for any port on any manageable module installed in the hub. To open the Port Status window:

1. Click button 3 in the Port Index or Port Status box to display the Port menu.
2. Drag down to **Status** and release.

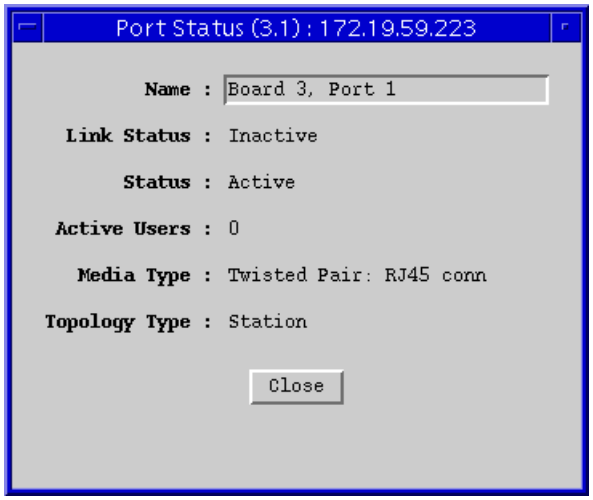


Figure 2-10. EMM-E6 Port Status Window

Note that the window title includes the module and port number in parentheses; the rest of the window contains the following fields:

Name

This text field can help identify the port; the information entered here is not displayed anywhere else in the Hub View.

To edit the Name:

1. Highlight the text in the Name box and type in a new name.
2. Press **Enter** or **Return** on the keyboard to save your change.

Link Status

The port's Link Status tells you whether or not the port has a valid connection to the node at the other end of the cable segment. The possible Link conditions are:

- **Active** — The port has a valid connection with the device at the other end of the port's cable.
- **Inactive** — The device at the other end of the cable is turned off, there is a break in the cable, or there is no device or cable connected.

- **Not Supported** — The selected port does not support the Link feature, so the EMM-E6 cannot determine link status; this value will show only for thin coax (BNC), AUI, or transceiver ports.

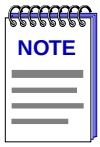
The fact that thin coax (BNC), AUI, and transceiver ports do not support the link feature can cause some misleading port status indicators: for example, a BNC port may show as segmented when, in fact, the cable has been disconnected; or an AUI or transceiver port may appear to have an active link when no cable has been attached. You should keep these anomalies in mind when troubleshooting a hub so equipped.

- **Unknown** — The EMM-E6 can't determine a link status.

Status

The port's Status can be one of three states:

- **Segmented**—A port becomes segmented (that is, disabled by the repeater module) when the port experiences 32 consecutive collisions, or when the port's collision detector is on for longer than approximately 2 to 3 milliseconds.



Because they do not support the link feature, thin coax (BNC) ports will display as segmented when there is no cable or terminator attached or the cable or terminator has been disconnected (i.e., a "no link" condition).

- **Active** —The port is operating normally.
- **Unknown** — The EMM-E6 cannot determine port status.

Active Users

Each active source address communicating through the port is counted as an active user. If Active Users is greater than two (or one for firmware versions previous to 2.00.16), it indicates that the port is supporting a trunk connection.

Media Type

Indicates the type of cable segment connected to the port. MIMs generally support a single media type. The supported media types are:

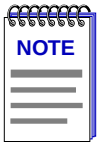
- BNC (thin coax)
- AUI
- Transceiver Port AUI
- Twisted Pair: RJ45 conn(ector)
- Twisted Pair: DB9 conn
- Twisted Pair: RJ71 conn
- Multi-Mode Fiber: SMA conn
- Multi-Mode Fiber: ST conn
- BNC EPIM

- AUI EPIM
- Transceiver Port AUI EPIM
- Twisted Pair: RJ45 EPIM
- Multi-Mode Fiber: SMA EPIM
- Multi-Mode Fiber: ST EPIM
- Single-Mode Fiber: ST EPIM
- Hardwired AUI EPIM
- Unknown *(for boards that don't support media type)*

Topology Type

Indicates how the port is being used. The available types are:

- **Station**—The port is receiving packets from no devices, from a single device, or from two devices. Note that a port in station status may actually be connected to multiple devices; station status simply indicates that no more than two devices are currently active.
- **Trunk**—The port is receiving packets from three or more devices; it may be connected to a coax cable with multiple taps, or to a repeater or another MIM.

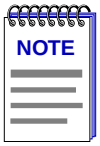


If you use the Trunk Type option on the Port menu to manually change a port's topology status from Force Trunk to Not Forced, any status change from trunk to station will not be reflected in the port display until the current cycle of the Source Address timer is complete. See Chapter 6, ***Source Addressing****, for more information on the timer.*

Older versions of EMM-E6 firmware (previous to revision level 2.00.16) use slightly different definitions of station and trunk status: station ports are defined as those which are detecting no source addresses or only a single source address; trunk ports are those detecting ***two*** *or more. If you have any questions about which definitions are employed by your version of firmware, or if you would like information about upgrading your EMM-E6 firmware, contact the Cabletron Systems Global Call Center. Also, see Chapter 6,* ***Source Addressing****, and Chapter 7,* ***Security,*** *for more information about station and trunk status.*

Viewing the IP Address Table

You can use the IP Address Table option on the Device menu to view the MAC (hardware) addresses of all installed interfaces, along with their associated interface numbers, interface types, interface descriptions, and any assigned IP addresses. The interface numbers 1-4 correspond to channel, or network, designations A, B, C, and D; interfaces available via BRIM port E will be indexed starting at 5, and those available via BRIM port F will follow.



You cannot change or assign an IP address from this window or from any other SPMA application.

To view the IP Address Table:

1. Click on Device to access the Device menu.
2. Drag down to **IP Address Table** and release.

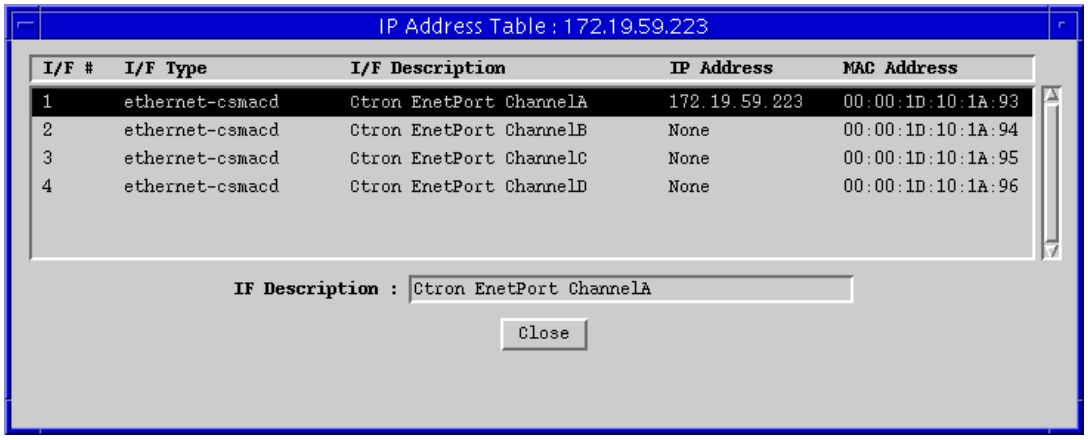


Figure 2-11. EMM-E6 IP Address Table

Note that the I/F Description for the highlighted interface is repeated in the text box at the bottom of the window; this allows for the complete display of the description, which may be truncated in the main window.

Launching the Global Find MAC Address Tool

You can launch the Global Find MAC Address Tool directly from the Hub View. With this tool you can perform a chassis-wide search for any bridge ports, repeater ports, or token ring ports through which a particular MAC address is communicating.

1. Click on Device to access the Device menu.
2. Drag down to **Find MAC Address** and release. The Global Find MAC Address Tool will launch. For more information on the Global Find MAC Address Tool, see the Utilities chapter in your ***SPMA Tools Guide***.

Checking Statistics

The Hub View can provide a summary of Ethernet statistics at the Network, Module, and Port levels. The windows that display the statistics contain the same statistical categories at each level.

To view hub statistics at the Network, Module, or Port levels:

1. Display the Network, Module, or Port menu by clicking mouse button 3 in the appropriate area (refer to Figure 2-5, page 2-7).
2. Drag down to **Statistics** and then right to either **General/Errors** or **Protocols/Frames**, and release.

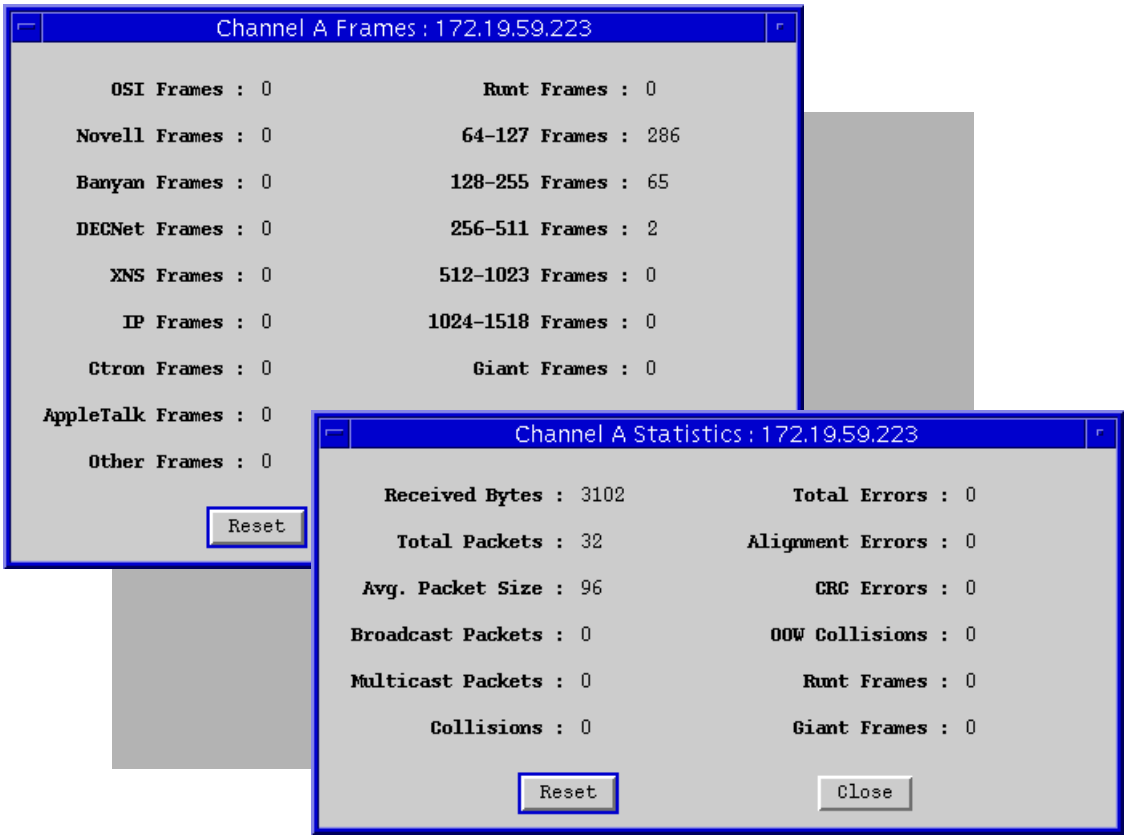
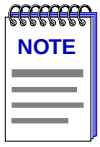


Figure 2-12. EMM-E6 Statistics Windows (Network Level)

Note that the network level statistics windows include the channel name in the window title; the module statistics windows include the module number in the title; and the port statistics windows includes the module and port number in the window title.

All statistical counters begin to increment when the windows are opened; to reset counters to zero, click mouse button 1 on Reset. Statistical counts are cumulative.



*Unless you close, then re-open, a window or use the **Reset** button, statistical counters will continue to increment until a value of 2^{32}-1 (approximately 4 billion) is reached, at which point they will roll over and restart at 0.*

General/Error Statistics

The General / Errors statistics windows display the following fields:

Received Bytes
The total number of bytes of data received by this network (channel), module, or port since the statistics window was opened or the **Reset** button was pressed.

Total Packets
The total number of packets of all types received by this network (channel), module, or port since the statistics window was opened or the **Reset** button was pressed.

Avg Packet Size
The average number of bytes per packet received by this network (channel), module, or port since the statistics window was opened or the **Reset** button was pressed. The average packet size is calculated after each polling interval by dividing the cumulative number of bytes received by the cumulative number of packets received.

Broadcast Packets
The total number of broadcast packets received by this network (channel), module, or port since the statistics window was opened or the **Reset** button was pressed. Broadcast packets have a single address recognized by each station on the net: this address is designated in IP form as 255.255.255.255, or in MAC hexadecimal form as FF-FF-FF-FF-FF-FF. The ARP and RARP requests sent by bridges and routers are broadcast packets.

Multicast Packets
The total number of multicast packets received by this network (channel), module, or port since the statistics window was opened or the **Reset** button was pressed. Multicast packets are simultaneously addressed to more than one address, but fewer than all addresses.

Collisions
The total number of collisions recorded by this network (channel), module, or port since statistics window was opened or the **Reset** button was pressed. The EMM-E6 counts both **receive** collisions — those detected while a port is receiving data — and **transmit** collisions — those detected while a port is transmitting data (i.e., the port has transmitted one of the colliding packets); however, these counts are combined and a single total value is displayed. Collisions of this type (called

"legal" collisions, as opposed to the OOW collisions described below) are a natural by-product of a busy network; if you are experiencing high numbers of collisions, it may be time to redirect network traffic by using bridges or routers. Extremely high collision rates can also indicate a data loop (redundant connections) or a hardware problem (some station transmitting without listening first).

Total Errors

The total number of errors of all types recorded by this network (channel), module, or port since the statistics window was opened or the **Reset** button was pressed.

Alignment Errors

The total number of misaligned packets recorded since the statistics window was opened or the **Reset** button was pressed. Misaligned packets are those which contain any unit of bits which is less than a byte — in other words, any group of bits fewer than 8. Misaligned packets can result from a packet formation problem, or from some cabling problem that is corrupting or losing data; they can also result from packets passing through more than two cascaded multi-port transceivers (a network design which does not meet accepted Ethernet spec).

CRC Errors

CRC, or Cyclic Redundancy Check, errors occur when packets are somehow damaged in transit. When each packet is transmitted, the transmitting device computes a frame check sequence (FCS) value based on the contents of the packet, and appends that value to the packet. The receiving station performs the same computation; if the FCS values differ, the packet is assumed to have been corrupted and is counted as a CRC error. CRC errors can result from a hardware problem causing an inaccurate computation of the FCS value, or from some other transmission problem that has garbled the original data. The CRC error counter shows the total number of CRC errors that were recorded since the statistics window was opened or the **Reset** button was pressed.

OOW Collisions

The total number of out-of-window collisions recorded since the statistics window was opened or the **Reset** button was pressed. OOW collisions occur when a station receives a collision signal while still transmitting, but more than 51.2 µsec (the maximum Ethernet propagation delay) after the transmission began. There are two conditions which can cause this type of error: either the network's physical length exceeds IEEE 802.3 specifications, or a node on the net is transmitting without first listening for carrier sense (and beginning its illegal transmission more than 51.2 µs after the first station began transmitting). Note that in both cases, the occurrence of the errors can be intermittent: in the case of excessive network length, OOW collisions will only occur when the farthest stations transmit at the same time; in the case of the node which is transmitting without listening, the malfunctioning node may only fail to listen occasionally, and not all of its failures to listen will result in OOW collisions — some may simply result in collisions (if the 51.2 µs window has not yet closed), and some will get through fine (if no one else happens to be transmitting).

Runt Frames

The total number of received packets smaller than the minimum Ethernet frame size of 64 bytes (excluding preamble). This minimum size is tied to the maximum propagation time of an Ethernet network segment — the maximum propagation time is 51.2 µs, and it takes approximately 51.2 µs to transmit 64 bytes of data; therefore, every node on the segment should be aware that another node is transmitting before the transmission is complete, providing for more accurate collision detection. Runts can sometimes result from collisions, and, as such, may be the natural by-product of a busy network; however, they can also indicate a hardware (packet formation), transmission (corrupted data), or network design (more than four cascaded repeaters) problem.

Giant Frames

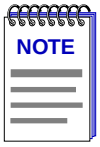
The total number of received packets that are longer than the maximum Ethernet size of 1518 bytes (excluding preamble). Giant packets typically occur when you have a jabbering node on your network — one that is continuously transmitting, or transmitting improperly for short bursts — probably due to a bad transmitter on the network interface card. Giant packets can also result from packets being corrupted as they are transmitted, either by the addition of garbage signal, or by the corruption of the bits that indicate frame size.

The EMM-E6 Error Priority Scheme

Each Cabletron device employs an error priority scheme which determines how packets with multiple errors will be counted, and ensures that no error packet is counted more than once. The priority scheme for the EMM-E6 counts errors in the following order:

1. OOW Collisions
2. Runts
3. Giants
4. Alignment Errors
5. CRC Errors

Knowing the priority scheme employed by the EMM-E6 can tell you a lot about the error counts you are seeing. For example, you know that the number of packets counted as CRC errors had *only* CRC errors — they were of legal size (not runts or giants) and had no truncated bytes. You also know that any packet less than 64 bytes long has been counted as a runt, even if it also had alignment and / or CRC problems (which is likely if the runt is the result of a collision or other transmission problem).



For more detailed information about error statistics and the possible network conditions they represent, consult the **Cabletron Systems Network Troubleshooting Guide**, *included with this package.*

Protocols/Frames Statistics

The Protocols / Frames statistics windows display the following fields:

Protocols

- OSI Frames
- Novell Frames
- Banyan Frames
- DECNet Frames
- XNS (Xerox Network Systems) Frames
- IP Frames
- Ctron Frames
- AppleTalk Frames
- Other Frames

Frame Sizes

- Runt Frames (packets smaller than 64 bytes)
- 64-124 (byte) Frames
- 128-255 Frames
- 256-511 Frames
- 512-1023 Frames
- 1024-1518 Frames
- Giant Frames (packets larger than 1518 bytes)

Viewing the Port Source Address List

The Port Source Address List accessible via the port-level menus displays the MAC address and its associated vendor name for each device communicating through a specific port in the EMM-E6-managed hub.

To view a port's Source Address List:

1. Click mouse button 3 in the appropriate Port Status or Port Index box to display the Port menu.
2. Drag down to **Source Address List**, and release.

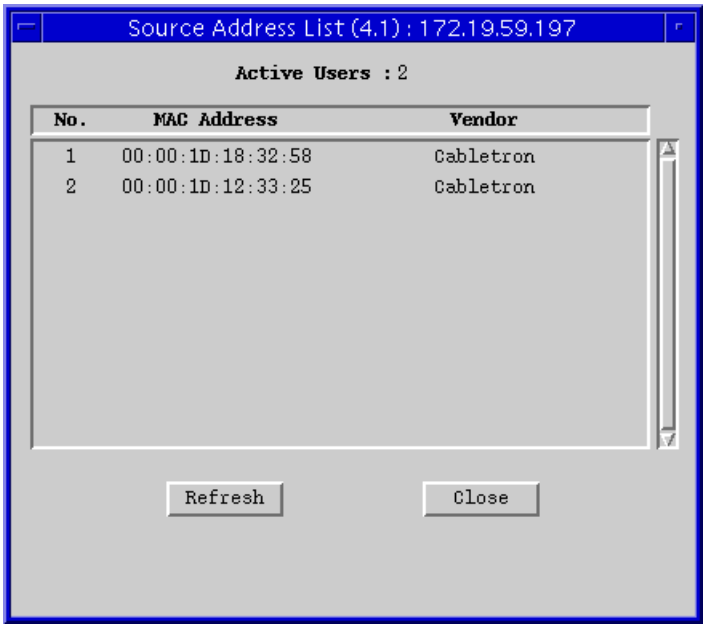
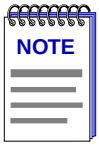


Figure 2-13. Port Source Address List

The Source Address List window displays the MAC addresses of all devices that have transmitted packets through the selected port within a time period less than the SAT's defined aging time (addresses that have not transmitted a packet during one complete cycle of the aging timer will be purged). The Aging Time is user-configurable; see **Setting the Aging Time** in Chapter 6 for more information. The list window can display about ten addresses at once; use the scroll bar to the right of the list window to view additional addresses, if necessary.

Since the SAT is constantly changing as old entries are aged out and new entries are added, you should occasionally update the displayed list by using the Refresh button. Once displayed, the list is static and will not reflect recent changes. Also static is the displayed number of **Active Users**; this field will also update when you click on Refresh.



The snapshots of the Source Address List that you can obtain via this feature do not reflect the current port security status of the SAT — that is, when Source Address Locking is enabled, you can still observe addresses being aged out of the table and new addresses being added as you refresh the Source Address List displayed in this window. However, the EMM-E6 remembers the addresses that were in the table when locking was enabled, and will continue to protect all locked ports from access by unauthorized sources. For more information, see ***Locking Source Addresses*** *in Chapter 6; see also Chapter 7,* ***Security.***

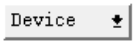
Also, keep in mind that the port-level source address list provides information about a single port only; for a complete list of source addresses communicating through the device as a whole, use the ***Source Addressing*** *option on the* ***Device*** *menu. Again, see Chapter 6 for more information.*

Managing the Hub

In addition to the performance information described in the preceding sections, the Hub View also provides you with the tools you need to configure your hub and keep it operating properly. Hub management functions include setting polling intervals, changing a RIC MIM's channel assignment, setting a port's trunk type, and enabling and disabling ports at the module level and individually.

Setting the Polling Intervals

To set the polling intervals used by SPMA and the EMM-E6:

1. Click on  to display the Device menu.
2. Drag down to **Polling Intervals**, and release.

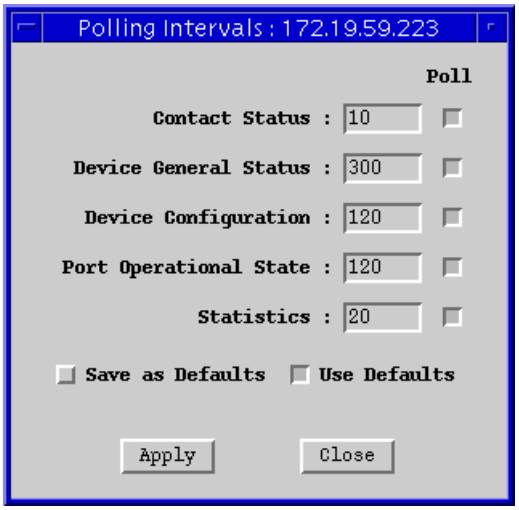


Figure 2-14. EMM-E6 Polling Intervals

3. To activate the desired polling, click mouse button 1 on the selection box to the right of each polling type field.
4. To change a polling interval, highlight the value you would like to change, and enter a new value in seconds. Note that the **Use Defaults** option must *not* be selected, or values will revert back to default levels when you click on Apply, and your changes will be ignored.
5. If you wish to use your new polling interval settings as the default values that SPMA will use for each EMM-E6 you are managing, use mouse button 1 to select the **Save As Defaults** option.
6. If you wish to replace existing values with the current set of default values, use mouse button 1 to select the **Use Defaults** option.
7. Click mouse button 1 on Apply once your changes are complete. Changes take effect after the current polling cycle is complete.

You can set the update intervals for the following:

Contact Status
This polling interval controls how often the EMM-E6 is "pinged" to check SPMA's ability to maintain a connection with the device.

Device General Status
This polling interval controls how often the Hub View Front Panel Information — such as Uptime, Device Name, and so forth — and some network, module, and port status information is updated.

Device Configuration

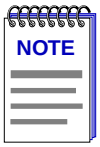
This polling interval controls how often a survey is conducted of the type of equipment installed in the EMM-E6-managed hub; information from this poll would change the Hub View to reflect the addition and / or removal of a MIM or MIMs.

Port Operational State

This polling interval controls the update of the information displayed in the Port Status boxes for each port in the hub. Port state information includes link state (the color code) and admin state (on or off).

Statistics

This polling interval controls how often the information displayed in the Port Status boxes is updated when the Port Display Form is set to a rate or percentage, and how often the Network, Module, and Port statistics counts are updated.



SPMA generates network traffic when it retrieves the above-described information; keep in mind that shorter intervals mean increased network traffic. Range limits for these polling times are 0-999,999 seconds; however, an entry of 0 will be treated as a 1.

Configuring FNB Connections

Cabletron Systems' MultiChannel technology allows you to configure multiple, separately-repeated channels in the same MMAC. Hubs which incorporate the Flexible Network Bus (FNB) design have three internal channels: the original power and management channel (designated as Channel A), and two additional Ethernet channels (designated as Channel B and Channel C) that are repeated separately.

Cabletron's original Media Interface Modules (MIMs) are automatically configured to operate on the original backplane channel, Channel A. However, Cabletron Systems' latest family of MIMs — Repeater, or RIC, MIMs (the FORMIM, CXRMIM, TPRMIM, and TPXMIM) — can be selectively configured to operate on the B or C channel, or, since they provide their own repeater functionality, in a stand-alone mode.

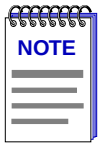
In addition, the newest member of the RIC MIM family — the TPXMIM — provides the ability to assign the entire board to a channel (bank switching), or to assign each individual port to a channel (port assignment). Also unique to the TPXMIM is the ability to assign each of its ports or the board as a whole to Channel A. The following sections describe how to configure the FNB connections for these MIMs.

Configuring RIC MIM Connections

Because each RIC MIM repeats packets independently, you can insert it into the network via backplane channels B or C, or isolate it to act as a self-contained network.

To change a RIC MIM's channel assignment:

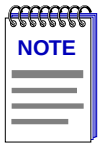
1. Click mouse button 3 in the appropriate area to display the Network menu (refer to Figure 2-5, page 2-7). Be sure to display the Network menu from the RIC MIM you wish to change, as this menu option applies *only* to the RIC MIM from which it was accessed.
2. Drag down to **Change Channel**, and right to select **Channel B**, **Channel C**, or **Standalone**. The new channel assignment will be displayed in the appropriate Network Connection box on the MIM display.



*Change Channel is the **only** option on the Network menu which does not apply to all MIMs operating on the same channel! If you wish to change a RIC MIM's channel assignment, you must do so by accessing the Network menu from **each** RIC MIM you wish to re-configure.*

Note that a RIC MIM in stand-alone mode becomes an "orphan MIM" and is no longer in full communication with the EMM-E6, and most network, module, and port menu options are disabled for that MIM. In addition, unless there is a direct cable connection, the packets it repeats are not being repeated to the other MIMs in the hub. However, you can still use the Network menu to put the RIC MIM back onto Channel B or C to re-enable all menu options and re-establish connection with the hub.

If your SPMA workstation is connected to a RIC MIM and you configure that RIC MIM to stand-alone mode, you will cut your station's contact with the network. If this happens, you will not be able to access the network again until you physically reconnect your station to a port that is active on the network.



If the FNB backplane in a non-shunting MMAC is broken by an empty slot between the RIC MIM and the EMM-E6, all MIMs to the left of the break which are operating on channels B and C will revert to the orphan, or stand-alone, state described above. This state change will be reflected in the Hub View display.

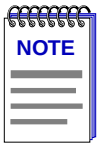
Configuring TPXMIM Connections

The TPXMIM provides two levels of FNB connectivity: you can assign the board as a whole or each individual port to one of the three internal FNB channels: A, B, or C; in addition, you can configure the whole board to operate in a stand-alone

mode. When configured to operate on channels B or C, the TPXMIM provides its own repeating; when operating on Channel A, its ports depend on the EMM-E6 for repeater functionality. All TPXMIM ports default to channel B when first installed.

To configure FNB connectivity for the board as a whole:

1. Click mouse button 3 in the appropriate area to display the Network menu (refer to Figure 2-5, page 2-7). Be sure to display the Network menu from the TPXMIM you wish to change, as this menu option applies *only* to the TPXMIM from which it was accessed.
2. Drag down to **Change Channel**, and right to select **Channel A**, **Channel B**, **Channel C**, **Standalone,** or **Restore B/C State**, as appropriate:
   a. Use the **Channel A**, **Channel B**, or **Channel C** options to switch the TPXMIM's channel to A, B, or C, as desired; keep in mind that each of these board-level settings will override any individual port-level settings.
   b. Use the **Standalone** option to switch all ports currently configured to use channels B or C to a stand-alone mode; this stand-alone mode is identical to the stand-alone mode for the other RIC MIMs, and has similar implications. However, note that any ports which are configured to operate on Channel A will remain connected to Channel A, and will not switch to stand-alone.

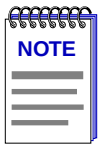


Be sure to refer to the Release Notes that were shipped with your EMM-E6 firmware for more information about the implications of operating your TPXMIM in a stand-alone mode.

   c. Use the **Restore B/C State** option to switch stand-alone ports back to the configuration status they had before they were switched to stand-alone: ports that were on Channel B will return to Channel B; ports that were on Channel C will return to Channel C. Again, this option does not affect any ports that were configured for Channel A; those will remain connected to Channel A. This option should only be used when the board is in a stand-alone state; if you select it when the board is assigned to a channel, the set will fail and an error message will be displayed.

To configure FNB connectivity for an individual port:

1. Click mouse button 3 on the appropriate Port Status or Port Index box to open the Port menu.
2. Drag down to **Change Channel**, then right to select **Channel A**, **Channel B**, or **Channel C**, as desired. Note that individual ports cannot be placed in stand-alone mode via this menu.



To place only selected ports in stand-alone mode, you must configure all other ports so that they are connected to Channel A; those ports will remain connected to Channel A when stand-alone mode is implemented, and only those ports connected to channels B or C will be put in stand-alone.

If you have configured the ports on the TPXMIM so that they are connected to different channels, the board's Network Connection box will display a letter representing each channel to which a TPXMIM port is connected. If the entire board is in stand-alone mode, three dashes (---) will display; if some ports are still connected to Channel A, two dashes and an A (-A-) will display.

In addition, keep in mind that most Network and Module menu selections can only provide information about a single network channel. When your TPXMIM is in multi-channel mode, making a selection from one of those menus will first bring up a channel selection window (Figure 2-15, below); click to select the appropriate channel, and the desired information will be displayed as usual.

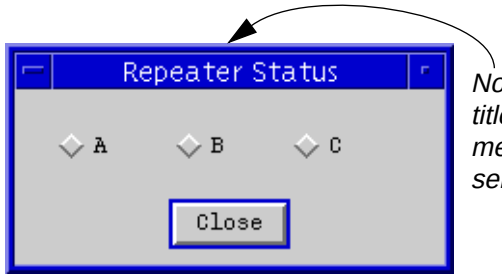


Figure 2-15. TPXMIM Channel Selection Window

Setting a Port's Trunk Type

Station ports and trunk ports are defined by how many source addresses are communicating through that port at any given moment: if zero, one, or two addresses are communicating, the port is considered to be a station port; if three or more are communicating, the port is considered to be a trunk port.

TIP

Older versions of EMM-E6 firmware (revision levels previous to 2.00.16) use slightly different definitions of station and trunk status: station ports are defined as those which are detecting no source addresses or only a single source address; trunk ports are those detecting ***two*** *or more.*

If you are running an older version of firmware, and all of the ports in your EMM-E6-controlled hub happen to be serving as station ports at the time you enable Source Address Locking — either because they are connected to a single node, or because users connected to that port happen not to be on the network at the time Source Address Locking is enabled — you may end up locking out devices or nodes that should have access. To avoid this, you may want to force key ports to trunk status, since trunk ports are unaffected by Source Address Locking.

If you are running a newer version of firmware, you can protect ports from being locked by forcing them to an Unsecurable status; see Chapter 7, ***Security****, for details. Note, too, that any port with more than 35 source addresses in its source address table is automatically considered to be unsecurable.*

If you have any questions about which definitions your version of firmware employs, or if you would like information about upgrading your EMM-E6 firmware, contact the Cabletron Systems Global Call Center. Also, see Chapter 6, ***Source Addressing****, and Chapter 7,* ***Security,*** *for more information about station and trunk status.*

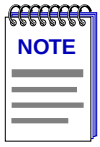
To change a port's topology status:

1. Click mouse button 3 on the appropriate Port Status box to open the Port menu.
2. Drag down to **Trunk Type**, then right to **Force Trunk** or **Not Forced**, and release.

NOTE

There are three ways to view a port's current topology status before making changes to its trunk type: check the Port Status window, which provides both the current number of active users and the current topology status; check the port's Source Address List, which lists the MAC address of each active user; or use the Topology port display form.

Once Source Address Locking is enabled, a port's topology state (trunk or station) cannot be changed, even by using the option described above. Once Source Address Locking is disabled, a port will respond to a change in topology status (either one forced by the Trunk Type option above, or one that occurs naturally due to a change in the number of active source addresses) at the beginning of the next Source Address Aging Time cycle.



If you use the Trunk Type option on the Port menu to manually change a port's topology status from Force Trunk to Not Forced, any status change from trunk to station will not be reflected in the port display until the current cycle of the Source Address timer is complete. See Chapter 6, ***Source Addressing****, for more information on the timer.*

Enabling/Disabling MIM Ports

You can enable and disable ports on any manageable MIM from both the Module menu, which affects all ports on a single module, and the Port menu, which affects individual ports.

To enable or disable all ports in a module:

1. Click button 3 on the Module Index or Module Type box to open the Module menu.
2. Drag down to **Enable All Ports** or **Disable All Ports**, as appropriate, and release. Disabled ports are blue.

When disabling all ports on a module, make sure you don't disable the port through which your management station is communicating with the hub, or you will lose contact with the device.

To enable or disable an individual port:

1. Click button 1 on the Port Status box to toggle the port On or Off.

   or

1. Click button 3 on the Port Index or Port Status box to display the Port menu.
2. Drag down to **Enable** or **Disable**, as appropriate, and release. The selected port changes color when its state changes. A disabled port is blue.

Chapter 3

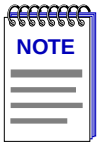
Alarm Configuration

Using Alarm Configuration; setting repeater alarm configuration; setting port and module alarm configuration

Alarms work in conjunction with your network management system to let you know when defined thresholds have been reached. You define the conditions that will trigger an alarm using the Alarm Configuration application. The EMM-E6 monitors activity and reports to your network management station, in the form of a trap, when a defined threshold is reached. You can set alarms at three levels:

- Repeater alarms monitor the combined activity of all ports within a single hub network.
- Module alarms monitor the combined activity of all ports within a single module.
- Port alarms monitor the activity of a single port.

The effect of an alarm depends on the parameters you have set via your management station.



SPMA does not accept trap messages; that task is left to your network management system. (See the appropriate network management system documentation for details about viewing trap messages.) When this application is used in stand-alone mode, traps will either be ignored when they return to the workstation from which you are running SPMA for the EMM-E6, or they will turn up at another management workstation which has been configured to accept traps. Note also that, regardless of the configuration performed using this application, NO traps will be sent by the device unless its trap table has been properly configured; see the EMM-E6 hardware manual and/or the ***Trap Table*** *chapter in the* ***SPMA Tools Guide*** *for more information.*

Using Alarm Configuration

To open the Alarms window

from the icon:

1. Click on the appropriate EMM-E6 icon to display the icon menu.
2. Drag down to **Alarm Configuration** and release.

from the Hub View:

1. In the Hub View, click on Device to display the Device menu.
2. Drag down to **Alarm Configuration** and release to open the Repeater Alarms window.

from the command line (stand-alone mode):

1. From the appropriate directory type:

```
spmarun r4al <IP Address> <community name>
```

NOTES

*The **spmarun** script invoked first in the above command temporarily sets the environment variables SPMA needs to operate; be sure to use this command any time you launch an application from the command line. The script is automatically invoked when you launch the application from the icon menu or from within the Hub View.*

*If you wish to change any Alarm Configurations, be sure to use a **community name** with at least Read/Write access. If you only wish to view current settings, a community name with Read access will be sufficient.*

*If there is a hostname mapped to your EMM-E6's IP address, you can use **<hostname>** in place of **<IP address>** to launch this application. Please note, however, that the hostname is **not** the same as the device name which can be assigned via Local Management and/or SPMA; you cannot use the device name in place of the IP address.*

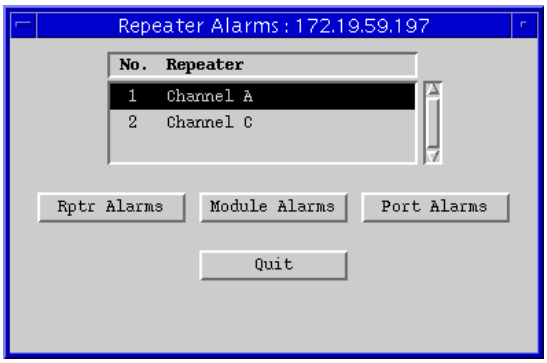
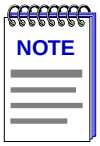


Figure 3-1. Repeater Alarms Window

Configuring Alarms

While configuring alarms for your EMM-E6 you must set the threshold and timebase that will factor in triggering the alarm. From the repeater alarms window you set an alarm timebase that applies to all enabled alarms at the repeater, module and port level; this timebase is the interval (in seconds) over which the selected variable(s) will be counted for comparison to the threshold values. The thresholds are configured separately for each alarm type and at each alarm level (repeater, module, and port). For example, if the Broadcasts alarm is enabled, the repeater-level threshold is set at 1000, and the timebase is set to 10 seconds, the EMM-E6 will generate an alarm if 1000 broadcast packets are processed within a 10-second time period; if the module-level threshold is set to 100, the EMM-E6 will also generate an alarm if 100 broadcast packets are processed by that module within the 10-second time period.



*Since alarm condition samples are taken at the **end** of the defined timebase interval, alarm conditions which occur over the span of two timebase intervals will not be detected even if the threshold is crossed within the defined timebase. For example, if the timebase is set to 10 seconds and the broadcast alarm threshold is set to 20, 20 or more broadcast packets may be detected in the last 5 seconds of one time interval and the first five seconds of the subsequent interval (for a total time interval of 10 seconds), but no alarm will be triggered because the broadcasts occurred within two **different** timebase intervals. The shorter the timebase, the more likely this condition is to occur.*

You can set alarm thresholds for the following variables:

Traffic

The traffic threshold determines the total number of packets that can be processed by the repeater, module, or port within the user-defined timebase before an alarm is triggered. Allowable values are 1 to ≈ 4 billion.

Collisions

The collisions threshold sets the number of collisions per good packet that will be allowed on the repeater, module, or port in the user-defined timebase before an alarm is generated. Allowable values are 1 to 15 collisions per good packet.

Errors

The errors threshold determines what percentage of total packets received by the repeater, module, or port within the specified timebase can be errors of the selected type or types before an alarm is triggered. Allowable values are one to 100; percentages will be calculated based on the number of error packets of all types selected. You can select any combination of the following error types:

CRC	If this check box is selected, all packets with Cyclical Redundancy Check (CRC) errors will be included in calculating the overall percentage of errors.

Alignment	If this check box is selected, all misaligned packets will be included in calculating the overall percentage of errors. A misaligned packet is one with an non-integral number of bytes; these are also sometimes referred to as framing errors.
Runts	If this check box is selected, the number of runt packets will be included in calculating the overall percentage of errors. A runt packet is one that is less than the minimum Ethernet frame size of 64 bytes.
Giants	If this check box is selected, the number of giant packets will be included in calculating the overall percentage of errors. A giant packet exceeds the maximum Ethernet frame size of 1518 bytes (excluding the preamble).
OOW Collisions	If this check box is selected, all collisions out of the standard collision window (51.2µs) will be included in calculating the overall percentage of errors. Out-of-window collisions are typically caused by faulty network design.

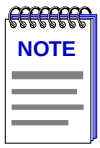
The CARGO description displayed in the alarm type list is an acronym representing the available error types: C = CRC, A = Alignment, R = Runts, G = Giants, O = OOW Collisions.This mask will only display the letters corresponding to the error types you have chosen to include in the overall percentage of errors.

Broadcast

The broadcasts threshold determines the number of broadcast packets that must be processed by the repeater, module, or port within the user-defined timebase before an alarm is reached. Allowable values are 1 to ≈ 4 billion.

Setting Repeater Alarms

A repeater alarm is based on the combined conditions of a hub network. You can set alarms for error levels (for all errors or just specific types of errors), broadcast packet traffic, data traffic, and collisions.



If an alarm type is not supported by your device the alarm configuration options of this type will be grayed out.

Setting and Changing Alarms

1. In the Alarms window, click mouse button 1 on a repeater selection in the scroll list.
2. Click mouse button 1 on [Rptr Alarms] to open the Set Repeater Alarms window.

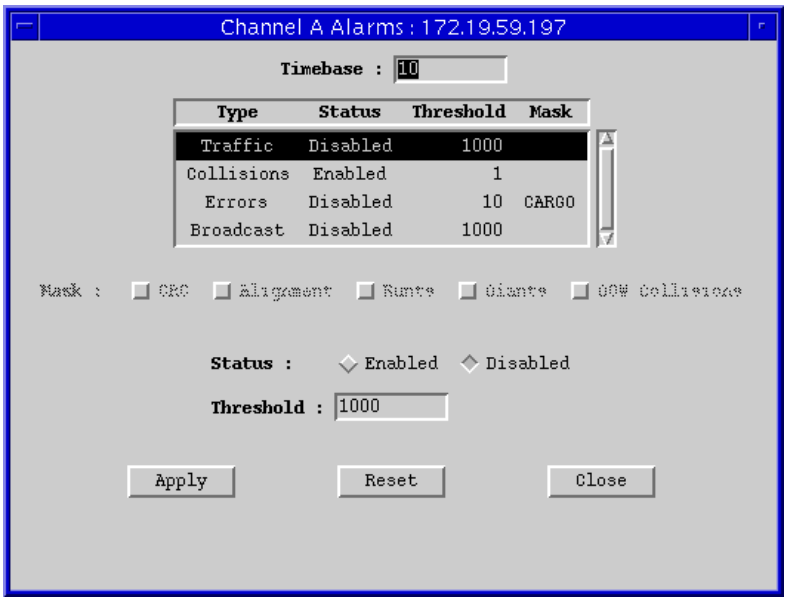
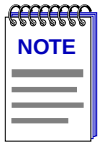


Figure 3-2. Set Repeater Alarms Window

3. In the Set Repeater Alarms window, select one of the alarm types: **Collisions**, **Errors**, **Traffic**, or **Broadcast**. If you select **Errors**, the **Mask** check boxes become active and you can select all or just some of the five different error types. The mask **CARGO**, displayed in the alarm type list, is an acronym for the error types: C = CRC, A = Alignment, R = Runts, G = Giants, O = OOW Collisions.
4. Highlight and edit the **Alarm Threshold**, which is the number that, if reached within the Timebase, triggers the alarm.
5. If necessary, highlight and edit the **Timebase**, which is the number of seconds you are allowing for an alarm condition to take place. For example, if the Timebase is set to 10, the Broadcast Alarm Type is enabled, and the Alarm Threshold is set to 25, the EMM-E6 generates an alarm if it observes 25 Broadcast packets within 10 seconds. A collision alarm is based on the number of collisions per good packet within the Timebase. Error alarms are based on the percentage of errors per total packets within the Timebase.
6. Click mouse button 1 on the **Enable** or **Disable** button to set the highlighted alarm's status, then click [Apply].



The Timebase applies to all enabled alarms, port-level and module-level alarms as well as repeater-level alarms. The Timebase appears in each alarms window — repeater, module, and port — but you can only edit it in the Repeater Alarms window.

*Since alarm condition samples are taken at the **end** of the defined timebase interval, alarm conditions which occur over the span of two timebase intervals will not be detected even if the threshold is crossed within the defined timebase. For example, if the timebase is set to 10 seconds and the broadcast alarm threshold is set to 20, 20 or more broadcast packets may be detected in the last 5 seconds of one time interval and the first five seconds of the subsequent interval (for a total time interval of 10 seconds), but no alarm will be triggered because the broadcasts occurred within two **different** timebase intervals. The shorter the timebase, the more likely this condition is to occur.*

Setting Module and Port Alarms

The following sections describe procedures for setting module and port alarm limits. Module-level alarms are based on the combined traffic within a particular module, while port-level alarms are based on an individual port.

Setting Module Alarms

1. In the Alarms window, click mouse button 1 on a repeater selection in the scroll list.
2. Click mouse button 1 on Module Alarms to open the Set Module Alarms window.

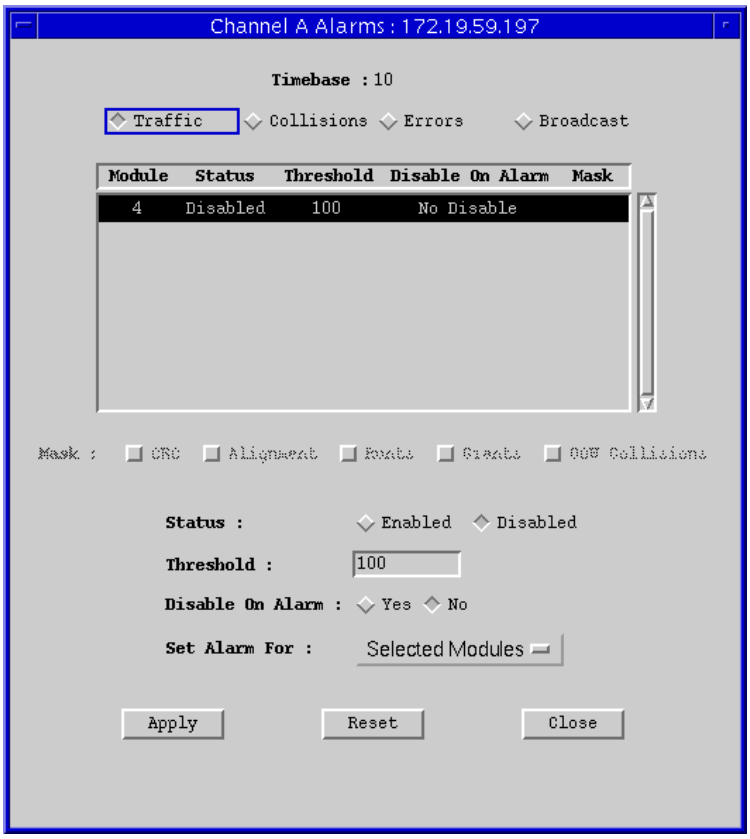


Figure 3-3. Set Module Alarms Window

3. Select one or more modules in the scroll list. To apply one set of conditions to all modules, you can either select each module in the list or use the **Set Alarm For** box at the bottom of the window to choose either **Selected Modules**, which applies the conditions to the modules you selected in the module list, or **All Modules**, which applies the conditions to all modules in the hub network.

4. Click mouse button 1 on one of the four Alarm Types: **Collisions**, **Errors**, **Traffic**, or **Broadcast**. (Alarm Types not available for this device are grayed.) If you select Errors, the **Mask** check boxes become active and you can select all or just some of the five error types. The Error Mask **CARGO**, displayed in the module list, is an acronym for the error types: C = CRC, A = Alignment, R = Runts, G = Giants, O = OOW Collisions.

5. Set the **Status** to **Enabled**.

6. Highlight and edit the **Alarm Threshold**, which is the percentage of errors/total packets, or the number of traffic packets, broadcast packets, or collisions/good packet within the Timebase that will activate the alarm.

7. If you select **Yes** for **Disable Module on Alarm**, the defined condition will cause the device to disable the module.

NOTE

If a module is disabled by an alarm, you must manually re-enable the module before it can again pass traffic. Resetting the device does not re-enable the module.

8. Click mouse button 1 on Apply .

Setting Port Alarms

1. In the Alarms window, click mouse button 1 on a repeater selection in the scroll list.
2. Click mouse button 1 on Port Alarms to open the Set Port Alarms window.

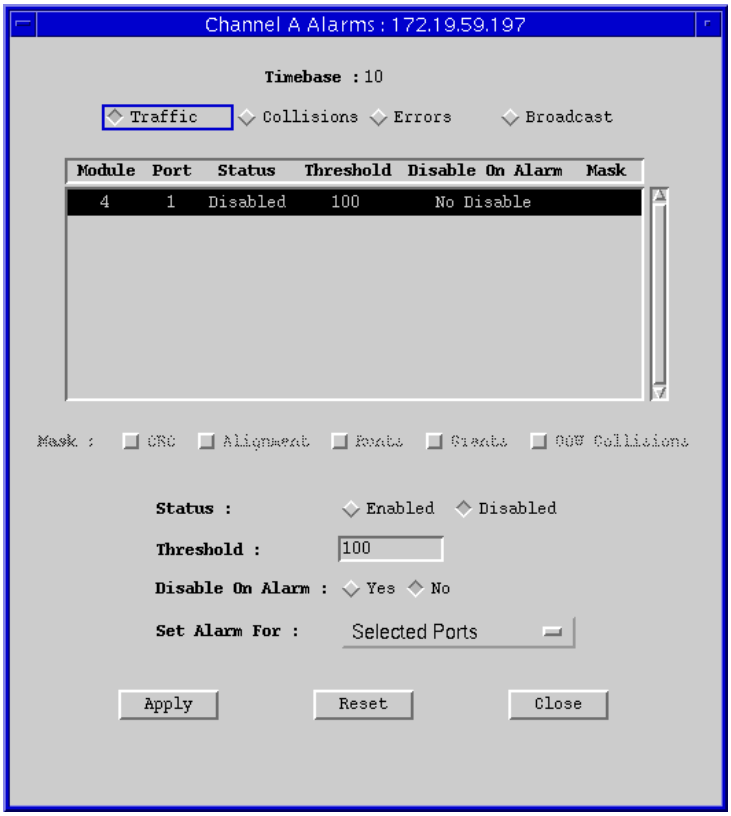
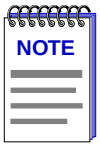


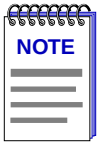
Figure 3-4. Set Port Alarms Window

3. Select one or more ports in the scroll list. To apply one set of conditions to all ports, you can either select each port in the list or use the **Set Alarm For** box at the bottom of the window to choose either **Selected Ports**, which applies the conditions to the ports you selected in the port list, or **All Ports on Repeater**, which applies the conditions to all the ports on the repeater, or **All Ports on Module**, which applies the conditions to all the ports on the module.
4. Click mouse button 1 on one of the four Alarm Types: **Collisions**, **Errors**, **Traffic**, or **Broadcast**. (Alarm Types not available for this device are grayed.) If you select Errors, the **Mask** check boxes become active and you can select all or just some of the five error types. The Error Mask **CARGO**, displayed in the module list, is an acronym for the error types: C = CRC, A = Alignment, R = Runts, G = Giants, O = OOW Collisions.
5. Set the **Status** to **Enabled**.
6. Highlight and edit the **Alarm Threshold**, which is the percentage of errors/total packets, or the number of traffic packets, broadcast packets, or collisions/good packet within the Timebase that will activate the alarm.
7. If you select **Yes** for **Disable Port on Alarm**, the defined condition will cause the device to disable the port.



If a port is disabled by an alarm, you must manually re-enable the port before it can again pass traffic. Resetting the device does not re-enable the port.

8. Click mouse button 1 on Apply .



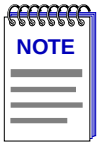
The Timebase applies to all enabled alarms, Port-level and module-level alarms as well as repeater-level alarms. The Timebase appears in each alarms window, repeater, module, and port, but you can only edit it in the Repeater Alarms window.

Chapter 4

Link/Seg Traps

What are Link and Segmentation traps; enabling and disabling these traps at the device, module, and port levels

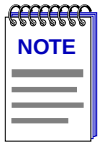
Among the traps which Cabletron devices are designed to generate are traps that indicate when a repeater port gains or loses a link signal, when the repeater segments (disconnects) a port due to collision activity, and when a segmented port becomes active again. In some networks, these Link and Segmentation traps may be more information than a network manager wants to see. So SPMA provides you with a means to selectively enable and disable Link and Segmentation traps: you can turn traps on and off for all ports on the device, all ports on a selected module or modules, or for individual ports.



SPMA does not accept the trap messages; that task is left to your network management system. (See the appropriate network management system documentation for details about viewing trap messages.) When this utility is used in stand-alone mode, traps will either be ignored when they return to the workstation from which you are running SPMA for the EMM-E6, or they will turn up at another management workstation which has been configured to accept traps. Note also that, regardless of the configuration performed using this utility, NO traps will be sent by the device unless its trap table has been properly configured; see the EMM-E6 hardware manual and/or the ***Trap Table*** *chapter in the* **SPMA Tools Guide** *for more information.*

What is a Segmentation Trap?

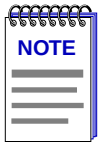
Cabletron's Ethernet repeaters count collisions at each port. If a port experiences 32 consecutive collisions, the repeater segments the port to isolate the source of the collisions from the rest of the network. When the repeater segments a port, it generates a **portSegmenting** trap. As soon as a segmented port receives a good packet, the repeater reconnects the port to the network and generates a **portUnsegmenting** trap.



Unterminated BNC (thin coax) ports appear in the Hub View as segmented ports. When you attach a thin coax cable or a 50 Ω terminator to a port, the repeater generates a ***portUnsegmenting*** *trap; when you remove the cable or terminator, the repeater generates a* ***portSegmenting*** *trap. Note also that devices at both ends of the cable will generate the* ***portUnsegmenting*** *and* ***portSegmenting traps****, even if only one end of the cable has been disconnected.*

What is a Link Trap?

Some Cabletron Ethernet repeater ports — including RJ45 twisted pair and fiber optic ports — generate a link signal to monitor the status of their connection with the device at the other end of the cable segment. If the cable is removed or broken, the port's link status goes to "No Link" and the repeater generates a **portLinkDown** trap. When a port in a "No Link" condition receives a link signal, the port goes to a "Link" condition and the repeater generates a **portLinkUp** trap. Note that devices at both ends of the disconnected or broken cable will generate the **portLinkDown** and **portLinkUp** traps, even when only one end of the cable has been removed.



BNC (thin coax), AUI, and transceiver ports do not support a link signal. As described above, BNC ports respond to changes in link status by generating portSegmenting and portUnsegmenting traps; AUI and transceiver ports do not respond at all to changes in link status (unless the port has been segmented due to excessive collisions), and will always display as on, even if no cable is connected.

Enabling and Disabling Link/Seg Traps

Although each Cabletron device comes with a number of traps built in to the firmware, no device will generate these traps unless it is configured to do so. This can be accomplished via Local Management (by enabling traps and entering your workstation's IP address in the Community Names screen), or via the SPMA Trap Table utility, accessible from the icon menu or from the command line. Once traps as a whole have been enabled, you can use the Link / Seg Traps feature to selectively enable and disable link and segmentation traps as required by your network management needs.

To open the Repeater Link / Seg Traps window

from the icon:

1. Click on the appropriate EMM-E6 icon to display the icon menu.
2. Drag down to **Link/Seg Traps** and release.

from the Hub View:

1. Click on Device to display the Device menu.
2. Drag down to **Link/Seg Traps** and release.

from the command line (stand-alone mode):

1. From the appropriate directory, type

```
spmarun r4hwtr <IP address> <community name>
```

NOTES

*The **spmarun** script invoked first in the above command temporarily sets the environment variables SPMA needs to operate; be sure to use this command any time you launch an application from the command line. This script is automatically invoked when you launch an application from the icon menu or from within the Hub View.*

*If you wish to change any Link/Seg Trap settings, be sure to use a **community name** with at least Read/Write access. If you only wish to view current settings, a community name with Read access will be sufficient.*

*If there is a hostname mapped to your EMM-E6's IP address, you can use **<hostname>** in place of **<IP address>** to launch this application. Please note, however, that the hostname is **not** the same as the device name which can be assigned via Local Management and/or SPMA; you cannot use the device name in place of the IP address.*

The main Repeater Link / Seg Traps window, Figure 4-1, will appear.

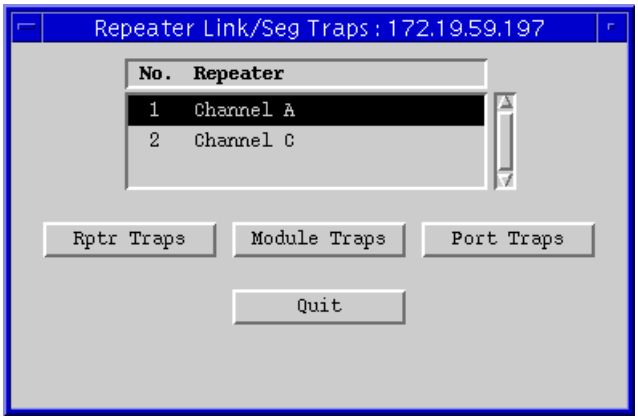


Figure 4-1. Repeater Link / Seg Traps Window

Configuring Link/Seg Traps for the Repeater

To enable or disable Link and Segmentation traps for all ports on a repeater:

1. In the Repeater Link/Seg Traps window, click mouse button 1 on the repeater interface for which you would like to configure link and segmentation traps.
2. Click mouse button 1 on Rptr Traps; the Channel X Link/Seg Traps window, Figure 4-2, will appear.

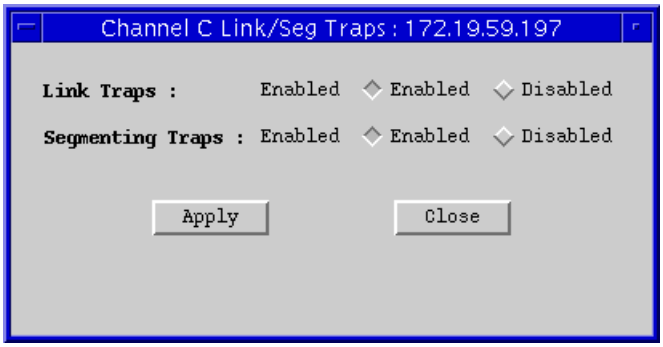


Figure 4-2. Channel X Link / Seg Traps Window

3. In the **Link Traps** field, click mouse button 1 on the appropriate selection to **Enable** or **Disable** link traps for the repeater.
4. In the **Segmenting Traps** field, click mouse button 1 on the appropriate selection to **Enable** or **Disable** segmenting traps for the repeater.
5. Click mouse button 1 on Apply to save your changes; the current status will be displayed in each field to the right of the field name. Click on Close to exit the window.

Viewing and Configuring Link/Seg Traps for Hub Modules

To enable or disable Link and Segmentation traps for all ports on the selected hub module or modules:

1. In the Repeater Link/Seg Traps window, select a repeater interface in the scroll list.
2. Click mouse button 1 on Module Traps; the module traps window, Figure 4-3, will appear.

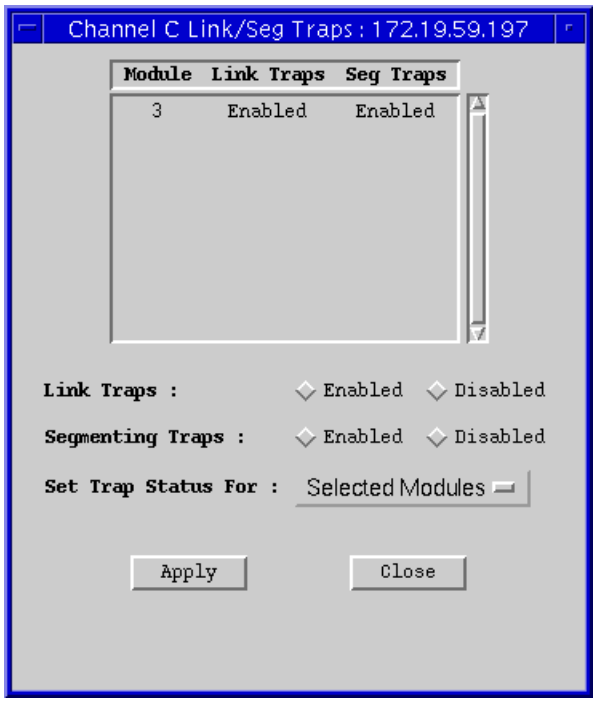


Figure 4-3. The Module Traps Window

3. In the Module Traps window, click mouse button 1 to select the module for which you wish to configure link and segmentation traps. If the **Set Trap Status For** field displays *Selected Modules* (the default setting), you can click to select any modules; to de-select any highlighted module, click on it again. If the selection *All Modules* is displayed in the **Set Trap Status For** field, all available modules will be automatically selected; if you de-select any module, the **Set Trap Status For** field will automatically revert to the *Selected Modules* setting. To change the setting in the **Set Trap Status For** field, click mouse button 1 on the currently displayed setting, and drag down to select a new setting.
4. Click on the appropriate selection in the **Link Traps** field to **Enable** or **Disable** link traps for the selected modules, as desired.
5. Click on the appropriate selection in the **Segmenting Traps** field to **Enable** or **Disable** segmenting traps, as desired.
6. Click on Apply to save your changes; click on Close to exit the window.

Viewing and Configuring Link/Seg Traps for Ports

To enable or disable Link and Segmentation traps for individual ports:

1. In the Repeater Link/Seg Traps window, select a repeater in the scroll list.
2. Click mouse button 1 on Port Traps; the port traps window, Figure 4-4, will appear.

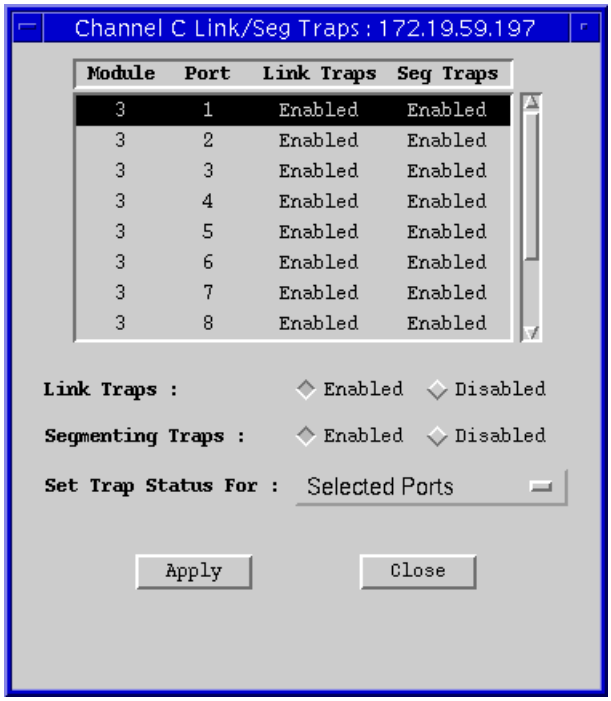


Figure 4-4. The Port Traps Window

3. In the port traps window, click mouse button 1 to select the port or ports for which you wish to configure traps. If the **Set Trap Status For** field displays *Selected Ports* (the default setting), you can click to select any ports; to de-select any highlighted port, click on it again. If the selection *All Ports on Module* is displayed in the **Set Trap Status For** field, you can select only one port at a time; trap status will be set for all ports on the same module as the selected port. If the selection *All Ports on Repeater* is displayed in the **Set Trap Status For** field, all available ports will be automatically selected; if you de-select any port, the **Set Trap Status For** field will automatically revert to the *Selected Ports* setting. To change the setting in the **Set Trap Status For** field, click on the currently displayed setting, and drag down to select a new setting.
4. Click on the appropriate selection in the **Link Traps** field to **Enable** or **Disable** link traps for the selected modules, as desired.

5. Click on the appropriate selection in the **Segmenting Traps** field to **Enable** or **Disable** segmenting traps, as desired.
6. Click on Apply to save your changes; click on Close to exit the window.

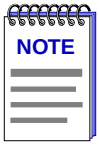
Chapter 5

Repeater Redundancy

This chapter describes how to configure and enable redundant circuits

Setting Network Circuit Redundancy

The redundancy application gives you the ability to define redundant circuits for your EMM-E6 to ensure that critical network connections remain operational. Each circuit has a designated primary port and one or more backup ports. The EMM-E6 monitors the link status of the primary port's connection to one or more network IP addresses; if the link fails, the EMM-E6 automatically switches traffic to a backup port.



Before you configure redundancy, make sure that only the primary physical link is connected to the network. If a backup port is connected before you configure and enable redundancy, you create a data loop.

To open the main Repeater Redundancy window

from the icon:

1. Click on the appropriate EMM-E6 icon to display the icon menu.
2. Drag down to **Redundancy** and release.

from the Hub View:

1. Click on Device to display the **Device** menu.
2. Drag down to **Redundancy** and release.

from the command line (stand-alone mode)

1. From the appropriate directory, type:

   `spmarun r4red <IP address> <community name>`

NOTES

*The **spmarun** script invoked first in the above command temporarily sets the environment variables SPMA needs to operate; be sure to use this command any time you launch an application from the command line. The script is automatically invoked when you launch the application from the icon menu or from within the Hub View.*

*If you wish to change any redundancy settings, be sure to use a **community name** with at least Read/Write access. If you only wish to **view** current settings, a community name with Read access will be sufficient.*

*If there is a hostname mapped to your EMM-E6's IP address, you can use **<hostname>** in place of **<IP address>** to launch this application. Please note, however, that the hostname is **not** the same as the device name which can be assigned via Local Management and/or SPMA; you cannot use the device name in place of the IP address.*

The main Repeater Redundancy window, Figure 5-1, will appear.

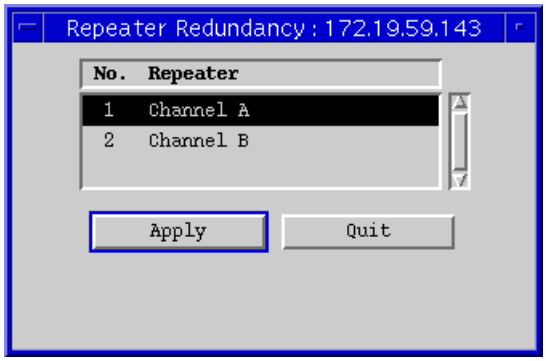


Figure 5-1. The Repeater Redundancy Window

Configuring a Redundant Circuit

To establish or edit a redundant circuit:

1. In the Repeater Redundancy window, click mouse button 1 on the repeater interface for which you would like to edit or establish a redundant circuit, then click Apply. The Channel X Redundancy window, Figure 5-2, will appear.

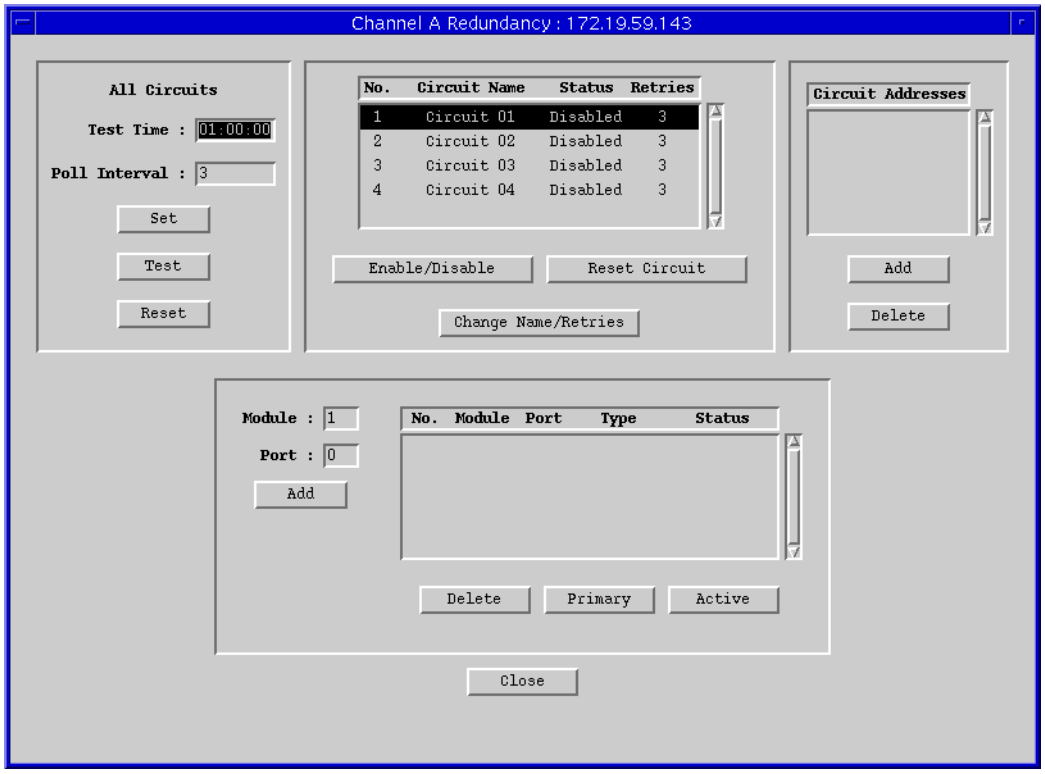


Figure 5-2. The Channel X Redundancy Window

2. If you want to change a circuit's name or the number of retries, highlight the appropriate circuit and click Change Name/Retries. The Change Circuit window, Figure 5-3, will appear.

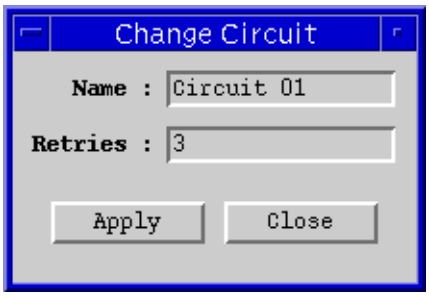


Figure 5-3. The Change Circuit Window

In the appropriate boxes, enter a new circuit name (up to 16 alphanumeric characters) and/or number of retries; **Retries** is the number of times the EMM-E6 tests the connection to the first IP address listed in the Circuit Addresses window before it gives up and moves on to the next address. The valid range of retries you can enter into this field is 0-16. Be sure to click on Apply before exiting the window to save your changes.

3. With the appropriate Circuit Name highlighted, click Add to access the Add Circuit Address window, Figure 5-4.

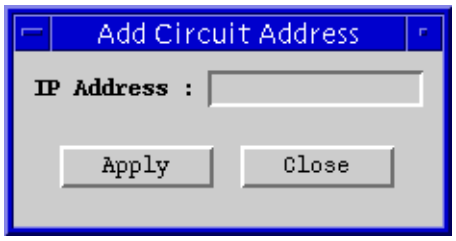
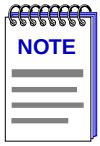


Figure 5-4. The Add Circuit Address Window

In this window you can define IP addresses of up to 8 devices on the network. These addresses identify the destination nodes that the EMM-E6 looks for to determine the status of the active link. If the device determines that it has lost the link with the first address in the Circuit Addresses list, it checks the link status with the next address. If it can't establish a link with any address in the list, the device switches traffic to a backup port.

a. To add a circuit address, enter a valid network IP address and then click Apply. Repeat as necessary to add additional addresses. Click Close to exit the window.

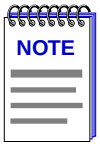


The EMM-E6 will poll the circuit addresses in the order they were entered.

b. To delete a circuit address, highlight the address in the Circuit Addresses list in the Channel X Redundancy window, and click Delete.

4. The bottom half of the Channel X Redundancy window is where you define the primary port and backup ports for the highlighted Circuit Name. Using the **Module** and **Port** boxes and the **Add** button, enter up to 8 ports to define the circuit.

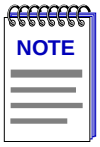
5. By default, all ports are created as **Inactive Backup** ports. You should set one port to be the Primary port and one port to be the Active port. Typically, the same port is both Primary and Active but this is not required. To select primary and active ports, click button 1 on a port to highlight it then click Primary; select the same or another port and click Active. Only one port can be the Primary port and only one port can be Active at any one time; if you set a different port to be Primary or Active, the original Primary or Active port automatically resets to Backup/Inactive.



*The **Status** of the Circuit Name must be set to **Disabled** when you configure the port list.*

*All backup ports will be disabled as soon as you enable the redundant circuit; the ports remain disabled until they become active due to primary port failure. Ports cannot be manually re-enabled until you have disabled **and reset** the circuit of which they were a part. Backup ports which are part of a disabled circuit cannot be manually re-enabled.*

6. Once you have configured all the ports that compose the redundant circuit, enable the circuit by clicking Enable/Disable.

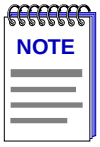


Be sure to make all physical connections to the backup ports once the redundant circuit has been configured and enabled.

To clear the settings in one circuit, highlight the Circuit Name that you want to clear, and click on Reset Circuit.

To clear all redundancy configurations, click on Reset in the All Circuits portion of the window. **Reset** does the following:

- Deletes all entries in the Circuit Addresses box
- Changes the status of every Circuit to Disabled
- Reverts to previous Circuit Name(s)
- Clears all module and port entries



After clearing redundancy settings by either method, backup ports remain disabled until you manually reenable them so that data loops do not occur. Before you enable the ports, disconnect their physical connections.

Monitoring Redundancy

Once you have configured your redundant circuits, you can use the fields in the All Circuits box to set the parameters that the EMM-E6 uses to periodically test each of the circuits. The EMM-E6 automatically polls all enabled circuits through the Primary port and all Backup ports at the time specified in the **Test Time** box. If the first poll fails (results in a no link condition with all of the circuit IP addresses), the EMM-E6 checks the circuit's **Retries** field. If **Retries** is greater than 0, the EMM-E6 waits the number of seconds specified in the **Poll Interval** field, and then polls the circuit again.

To set the **Poll Interval**:

1. In the All Circuits box, type in a new value in the **Poll Interval** field and click Set. Poll Interval is the time in seconds between retries (if the first attempt is unsuccessful).

To set the **Test Time**:

1. In the All Circuits box, type a new test time in the **Test Time** field in a 24-hour HH:MM:SS format and click Set. The Test Time is the time of day when the EMM-E6 polls the addresses listed in each of the enabled circuits.

To immediately test all enabled circuits:

1. Click Test in the All Circuits box.

Chapter 6

Source Addressing

Displaying the Source Address list; setting the Aging Time; selecting the Hash Type; effects of Source Address Locking; configuring Source Address traps; finding a Source Address

---

Displaying the Source Address List

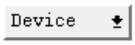
The Source Address List, or Table (SAT), contains the MAC address and its associated vendor name for each device communicating through a port in the EMM-E6-controlled hub. Each detected source address is also identified by the module and port through which it is communicating with the EMM-E6.

To view a EMM-E6's Source Address List:

from the icon:

1. Click on the appropriate EMM-E6 icon to display the icon menu.
2. Drag down to **Source Address** and release.

from the Hub View:

1. Click on 

to display the Device menu.
2. Drag down to **Source Address** and release.

from the command line (stand-alone mode):

1. From the appropriate directory, type

   `spmarun r4sa <IP address> <community name>`

NOTES

*The **spmarun** script invoked first in the above command temporarily sets the environment variables SPMA needs to operate; be sure to use this command any time you launch an application from the command line. This script is automatically invoked when you launch an application from the icon menu or from within the Hub View.*

*If you wish to change any Source Address settings, be sure to use a **community name** with at least Read/Write access. If you only wish to view current settings, a community name with Read access will be sufficient. If you wish to lock or unlock ports, you must use a community name with SuperUser access.*

*If there is a hostname mapped to your EMM-E6's IP address, you can use **<hostname>** in place of **<IP address>** to launch this application. Please note, however, that the hostname is **not** the same as the device name which can be assigned via Local Management and/or SPMA; you cannot use the device name in place of the IP address.*

The Repeater Source Address window, Figure 6-1, will appear.

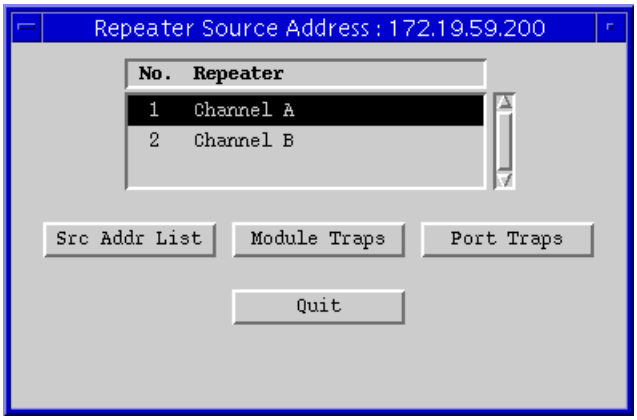


Figure 6-1. The Repeater Source Address Window

The Repeater Source Address window provides a list of the repeater interfaces available on the EMM-E6, as well as command buttons that allow you to display the Source Address List and enable and disable module and port source addressing traps.

NOTE

*The ability to enable or disable source addressing traps at the module and port level is not available in all versions of repeater device firmware; if the **Module Trap** and **Port Trap** buttons are grayed out, these features are not available on your device. Contact the Cabletron Systems Global Call Center for more information on upgrading your device firmware.*

To view the source address list for the device, highlight the interface for which you wish to view the SAT, then click mouse button 1 on Src Addr List; the Source Address List window, Figure 6-2, will appear.

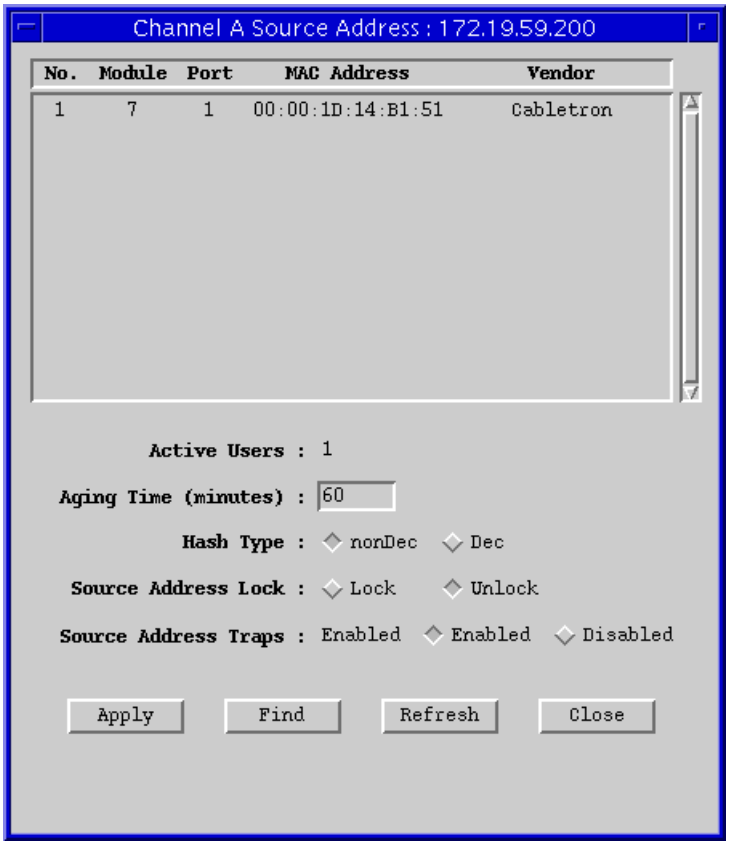
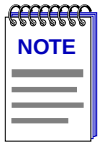


Figure 6-2. The Source Address List Window

The Source Address List window displays addresses of all devices that have transmitted packets through the EMM-E6 within a time period less than the SAT's defined aging time (addresses that have not transmitted a packet during one complete cycle of the aging timer will be purged). The Aging Time is user-configurable; see **Setting the Aging Time**, page 6-4. The list window can display about ten addresses at once; use the scroll bar to the right of the list window to view additional addresses, if necessary.

Since the SAT is constantly changing as old entries are aged out and new ones learned from the network, you should occasionally update the displayed list by clicking mouse button 1 on Refresh. Once displayed, the list is static and will not reflect recent changes. Also static is the displayed number of **Active Users**; this field will also update when you click on Refresh.



The snapshots of the Source Address List that you can obtain via this feature do not reflect the current port security status of the SAT — that is, when Source Address Locking is enabled, you can still observe addresses being aged out of the table and new addresses being added as you refresh the Source Address List displayed in this window. However, the EMM-E6 remembers the addresses that were in the table when locking was enabled, and will continue to protect locked ports from access by unauthorized sources. For more information, see ***Locking Source Addresses****, page 6-5.*

Setting the Aging Time

The source address list Aging Time determines the *minimum* amount of time an inactive source address will remain in the Source Address Table before it is purged. The source address timer runs continuously beginning at the time the device is turned on; source addresses that are added to the SAT during one timer cycle will remain in the table for the rest of the current cycle and at least through the next complete cycle. If no packets have been received from that address during one complete cycle, the address will be purged.

The Aging Time is user-configurable, and can be set using the **Aging Time** text box in the Source Address list window.

To change the Aging Time:

1. In the Source Address List window (Figure 6-2, page 6-3), highlight the displayed aging time.
2. Enter your desired aging time in minutes; allowable range is 0 to 4320 (three days).
3. Click mouse button 1 on Apply to save your change.

The new Aging Time takes effect immediately.

Setting the Hash Type

You can increase the efficiency with which your EMM-E6 handles the Source Address Table by selecting the appropriate hashing algorithm. If you are operating in a DECnet environment, or one which incorporates some DECnet elements, select the DEC hashing algorithm; if your network contains no DECnet elements (or at least none operating on the same network segment as your EMM-E6), select the non-DEC hashing algorithm. Making the wrong selection won't do any damage, but making the correct selection will optimize performance.

To set the Hash Type for a repeater interface, or channel:

1. In the Repeater Source Address window, click mouse button 1 on the repeater interface for which you would like to set the hash type.

2. Click mouse button 1 on Src Addr List; the Channel X Source Address List window, Figure 6-2 (page 6-3), will appear.
3. In the **Hash Type** field, click mouse button 1 on the appropriate selection to apply **Dec** or **nonDec** hashing to all ports on the selected repeater channel.
4. Click mouse button 1 on Apply to save your changes; click on Close to exit the window.

NOTE

If your EMM-E6 firmware does not support the Hash Type feature, this field will be unavailable.

Locking Source Addresses

When Source Address Locking is enabled, it puts into place a number of security measures designed to protect your hub from unauthorized access. Depending on the revision of firmware installed on your EMM-E6 and the kinds of MIMs in the hub, locking ports can provide a number of different protections, including secure address assignment, trunk port locking, configurable violation response, both eavesdrop and intruder protection, multi-level locking modes, and new definitions for station and trunk ports: station ports are those detecting zero, one, or *two* source addresses; trunk ports are those detecting *three* or more.

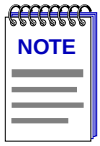
Enabling port locking from the Source Address List window activates all applicable security protections, as configured via the Security application (described in **Chapter 7** of this guide).

NOTE

Since the multi-level locking feature cannot be implemented from the Source Address List window, locking ports from this window will apply Full lock status by default to any ports which are currently unlocked. Any ports which are already in Continuous lock mode, however, will remain so. For more information on these lock modes and other security features, see Chapter 7, ***Security****.*

To enable or disable Source Address Locking:

1. Click mouse button 1 on the appropriate option in the **Source Address Lock** field.
2. Click mouse button 1 on Apply to set your new lock status.



Remember, you must have SuperUser (SU) access to the device in order to lock or unlock ports.

In addition to activating the security measures as configured via the Security application, locking source addresses has the following effects:

- On devices running older versions of firmware, unlinked ports will be disabled immediately after locking has been enabled; these ports can be re-enabled using their port menus, but they will immediately be disabled again if a device is connected and begins transmitting (since the port's source address table was locked in an empty state). On devices with newer firmware, unlinked ports are not automatically disabled in response to port locking, but they, too, will be immediately disabled if a device is connected and attempts to transmit packets.
- Although the Source Aging Interval does not apply to station ports when Source Address Locking is enabled, the snapshot of the SAT provided by the Source Address List window may show a learned source address aging out if that address remains inactive, and the appropriate trap will be generated.
- Once Source Address Locking has been enabled, each port's topology status (station or trunk) remains fixed and will not change while locking remains enabled, regardless of any changes in the number of source addresses detected.
- If Source Address Locking has been enabled, and one or more ports have been shut down because a new source address attempted access, those ports will remain disabled even after the EMM-E6 has been reset, and must be re-enabled manually.

Source Address Locking on Older Devices

If your EMM-E6 is running a firmware version previous to 2.00.16, Source Address Locking is implemented somewhat differently:

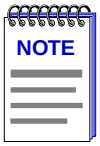
- Station ports are defined as those detecting zero or one source address; trunk ports as those detecting two or more.
- If a locked station port experiences a violation, the port will be automatically disabled and no traffic will be allowed through — not even traffic from the known source address.
- Trunk ports are never locked.
- Unlinked ports are immediately disabled.
- The Source Aging Interval does not apply to locked station ports.

- A port's topology status (station or trunk) remains fixed while locking is in effect, even if the number of detected addresses changes.
- Any ports disabled due to a violation (or because they were unlinked when locking was enabled) must be manually re-enabled via their Port menus, and
- There are no additional Security features available.

If you are not sure which set of port locking features your device firmware supports, contact the Cabletron Systems Global Call Center.

Configuring Source Address Traps

The EMM-E6 can issue several different traps in response to changes in the Source Address Table; you can enable and disable certain of these traps for the repeater as a whole, and, if your device has very new firmware, they can also be enabled or disabled for each individual module and port.



*If the **Module Traps** and **Port Traps** buttons on the Repeater Source Address screen are grayed-out, your device firmware does NOT support the ability to enable and disable source addressing traps at the module and port levels. Contact the Cabletron Systems Global Call Center for information about upgrading your device firmware.*

*SPMA does not accept the trap messages; that task is left to your network management system. (See the appropriate network management system documentation for details about viewing trap messages.) When this utility is used in stand-alone mode, traps will either be ignored when they return to the workstation from which you are running SPMA for the EMM-E6, or they will turn up at another management workstation which has been configured to accept traps. Note also that, regardless of the configuration performed using this utility, NO traps will be sent by the device unless its trap table has been properly configured; see the EMM-E6 hardware manual and/or the **Trap Table** chapter in the* **SPMA Tools Guide** *for more information.*

You can enable and disable the following Source Address traps:

- A **newSourceAddress** trap is generated when a station port — one receiving packets from zero, one, or two source addresses — receives a packet from a source address that is not currently in its source address table. Information included in this trap includes the board number, port number, and source address associated with the trap. Trunk ports — those receiving packets from three or more source addresses — will not issue newSourceAddress traps.
- A **sourceAddressTimeout** trap is issued anytime a source address is aged out of the Source Address Table due to inactivity. The trap's interesting information includes the board and port index, and the source address that timed out. (See **Setting the Aging Time**, page 6-4, for more information.)

Other traps that will be sent in response to changes in source addressing (even when the above traps have been disabled) include:

- **PortTypeChanged** traps are issued when a port's topology status changes from station to trunk, or vice versa. The interesting information includes the board and port index, and the port's new topology status.
- A **lockStatusChanged** trap is generated when the ports in the hub are locked or unlocked using the Source Address Lock option in the Source Address List window or by using the lock options in the Security application; the interesting information is the new lock status. (See **Locking Source Addresses**, page 6-5, or Chapter 7, **Security**, for more information.)
- **PortSecurityViolation** and **portViolationReset** traps are sent in response to changes related to port locking: if ports are locked, the **portSecurityViolation** trap indicates that a new source address has attempted access on one of the ports, and the configured security actions are being taken; the interesting information is the board and port index, and the violating address. **PortViolationReset** traps are sent when management intervention has re-enabled a port or ports previously disabled in response to a port security violation; the interesting information is board and port index. Again, see **Locking Source Addresses**, page 6-5, for more information.

Repeater-level Traps

The current status of the repeater-level source addressing traps is displayed in the **Source Address Traps** field in the Source Address List window (Figure 6-2, page 6-3).

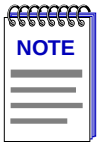
A status of **Enabled** indicates that source address traps have been enabled for *all* ports on *all* modules installed in the EMM-E6-controlled hub; a status of **Disabled** indicates that source address traps have been disabled for *all* ports on *all* modules; and a status of **Other** indicates that there is some combination of enabled and disabled source address traps on the modules and / or ports in the hub or device.

To change the current status and enable or disable traps for all ports in the EMM-E6-controlled hub:

1. Click mouse button 1 on the appropriate option in the **Source Address Traps** field.
2. Click button 1 on Apply to set your new trap status; the new status will be displayed to the left of the options in the **Source Address Traps** field. Note that enabling or disabling traps at the repeater level will eliminate any status of **Other** by setting all ports on all modules to the same status.

Module- and Port-level Traps

To set module- and port-level source addressing traps, select the appropriate channel in the Repeater Source Address window, then click on Module Traps to enable and disable module-level traps, or on Port Traps to enable and disable port-level traps.



It is not necessary to close the Source Address List before launching the module and port traps windows; just move the Source Address List window out of the way, if necessary, to reach the main Repeater Source Address window.

As with repeater-level trap status, a status of **Other** for any module indicates that there is some combination of enabled and disabled source address traps on the ports in that module.

To configure trap status for all ports on a selected module or modules:

1. In the Module Source Address Traps window (Figure 6-3, next page), click mouse button 1 to select the module for which you wish to enable or disable traps. If the **Set Trap Status For** field displays *Selected Modules* (the default setting), you can click to select any modules; to de-select any highlighted module, click on it again. If the selection *All Modules* is displayed in the **Set Trap Status For** field, all available modules will be automatically selected; if you de-select any module, the **Set Trap Status For** field will automatically revert to the *Selected Modules* setting. To change the setting in the **Set Trap Status For** field, click mouse button 1 on the currently displayed setting, and drag down to select a new setting.
2. Click on the appropriate selection in the **Trap Status** field to enable or disable traps for the selected modules, as desired.
3. Click on Apply to save your changes. Note that enabling or disabling traps at the module level will eliminate any module status of **Other** by setting all ports on the selected module or modules to the same status.

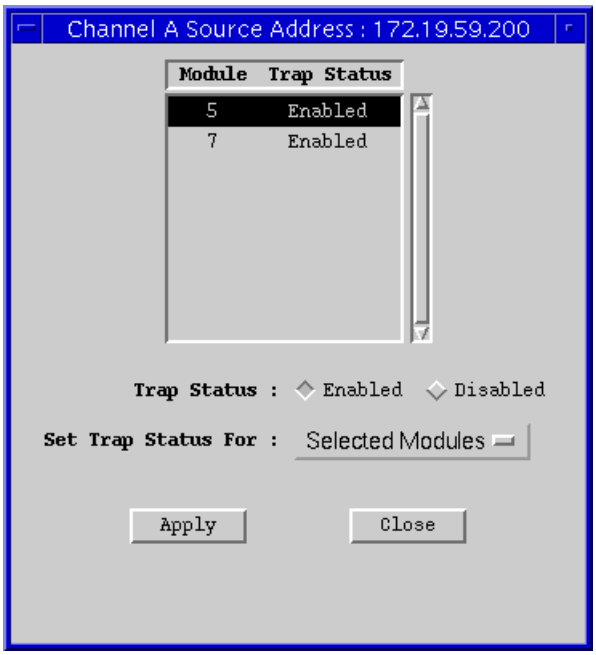


Figure 6-3. The Module Source Address Traps Window

To enable or disable port-level traps:

1. In the Port Source Address Traps window (Figure 6-4, below), click mouse button 1 to select the port or ports for which you wish to enable or disable traps. If the **Set Trap Status For** field displays *Selected Ports* (the default setting), you can click to select any ports; to de-select any highlighted port, click on it again. If the selection *All Ports On Module* is displayed in the **Set Traps Status For** field, you can select only one port at a time; trap status will be set for all ports on the same module as the selected port. If the selection *All Ports on Repeater* is displayed in the **Set Trap Status For** field, all available ports will be automatically selected; if you de-select any port, the **Set Trap Status For** field will automatically revert to the *Selected Ports* setting. To change the setting in the **Set Trap Status For** field, click mouse button 1 on the currently displayed setting, and drag down to select a new setting.

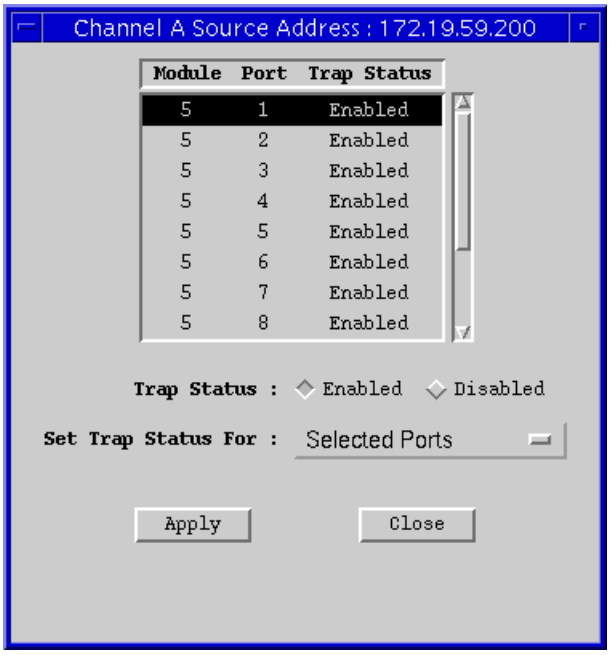


Figure 6-4. The Port Source Address Traps Window

2. Click on the appropriate selection in the **Trap Status** field to enable or disable traps for the selected port(s), as desired.
3. Click on Apply to save your changes.

Finding a Source Address

You can use the Find button to locate a source address in the list by the module and port through which it is communicating with the EMM-E6. This feature is especially useful when your device is very busy and your source address table is quite large.

NOTE

Note that each repeater channel maintains its own Source Address Table, and they are completely independent of one another; therefore, if you search for a source address communicating via Channel B from the Channel A Source Address List window, the result will be a "not found," even though the address is connected to a port in the EMM-E6-controlled hub.

To find a source address:

1. Click mouse button 1 on Find in the Source Address List window (Figure 6-2, page 6-3); the Find Source Address window, Figure 6-5, will appear.

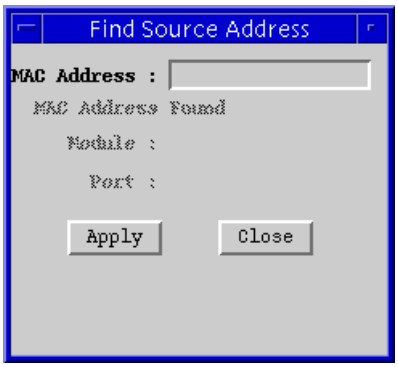


Figure 6-5. Find Source Address Window

2. In the **MAC Address** field, enter the source address you wish to locate in a hexadecimal (XX:XX:XX:XX:XX:XX) format.
3. Click on Apply. If the address is in the table at the time the search is initiated, the remaining fields in the window will display the module and port through which the address is communicating with the EMM-E6. If the address is not in the table, the message **MAC Address Not Found** will display in the window. See Figure 6-6, below.

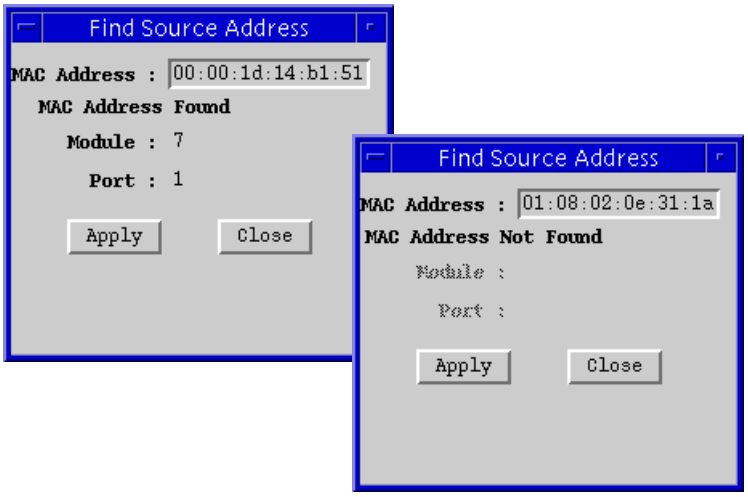


Figure 6-6. Results of MAC Address Search

4. Click on Close to exit the window.

Chapter 7

Security

Launching the Security application; LANVIEW SECURE defined; configuring security; enabling security and traps at the repeater, module, and port levels; security on non-LANVIEW SECURE MIMs

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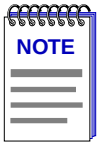
The Security application allows you to configure and manage the *LANVIEW* SECURE feature incorporated into the new generation of Cabletron's repeater family of MIMs: the TPRMIM-xxS, FORMIM-xxS, CXRMIM-S, and TPXMIM-xxS. *LANVIEW* SECURE provides enhanced intruder protection by allowing you to secure two source MAC addresses per port, along with an additional floating cache of up to 32 addresses among ports on a single board; in addition, *LANVIEW* SECURE provides eavesdrop protection by scrambling the data portion of each packet to all ports except the destination port.



Some portions of LANVIEW SECURE functionality will apply to ***all*** *ports in the EMM-E6-managed chassis, including ports residing on older, non-LANVIEW SECURE MIMs; these will be noted throughout the text, and summarized in the section entitled* ***Security on Non-LANVIEW SECURE MIMs****, on page 7-5.*

To launch the Security application

from the icon:

1. Click on the appropriate EMM-E6 icon to display the icon menu.
2. Drag down to **Security** and release.

from the Hub View:

1. Click on Device to display the Device menu.
2. Drag down to **Security** and release.

from the command line (stand-alone mode):

1. From the appropriate directory, type

   `spmarun r4sec <IP address> <SU community name>`

NOTES

*The **spmarun** script invoked first in the above command temporarily sets the environment variables SPMA needs to operate; be sure to use this command any time you launch an application from the command line. This script is automatically invoked when you launch an application from the icon menu or from within the Hub View.*

*You must use a **community name** with Superuser access to run the Security application.*

*If there is a hostname mapped to your EMM-E6's IP address, you can use **<hostname>** in place of **<IP address>** to launch this application. Please note, however, that the hostname is **not** the same as the device name which can be assigned via Local Management and/or SPMA; you cannot use the device name in place of the IP address.*

The Repeater Security window, Figure 7-1, will appear.

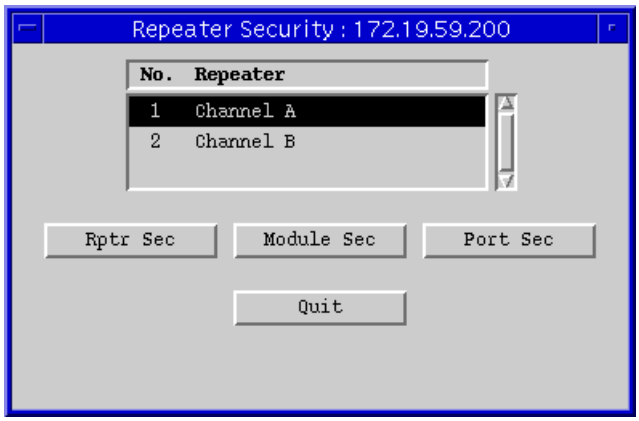


Figure 7-1. The Repeater Security Window

The Repeater Security window provides a list of the repeater interfaces available on the EMM-E6, as well as command buttons that allow you to configure security at the repeater, module, and port levels.

What is *LANVIEW*SECURE?

*LANVIEW*SECURE comprises a set of enhanced security features that have been implemented on the new generation of Cabletron's repeater MIM family (as designated by the letter "S" at the end of the module name); these features are supported beginning with EMM-E6 firmware version 2.00.16, with the newest enhancements supported by firmware versions 3.11.xx and later.

When the *LANVIEW*SECURE feature is enabled, it provides two kinds of protection: *intruder protection* will prevent any unauthorized source addresses from communicating with the network via a secure port, and can be configured to secure both station and trunk ports; *eavesdropper protection* scrambles the data portion of any packet transmitted via a secure port to all but the destination port, and can be extended to broadcast and multicast packets as well as packets destined for a single address. Security is activated by enabling port locking; you can lock and unlock ports and enable or disable traps at the repeater-, module-, and port-level Security windows, as well as via the Source Address windows (see Chapter 6, **Source Address**, for more information).

When you lock ports from a repeater-, module,-, or port-level Security window, you have the option of setting two lock modes: Full or Continuous. When you lock ports via a Source Address window, the lock setting will default to the Full lock mode. See the section on Continuous Address Learning, below, or ***Enabling Security and Traps****, page 7-12, for more information on these two lock modes.*

*LANVIEW*SECURE includes the following features:

New definitions for station and trunk ports

Under *LANVIEW*SECURE, station ports are now defined as those detecting zero, one, or ***two*** source addresses; trunk ports are defined as those detecting ***three*** or more.

Secure address assignment

The first two source addresses detected on any port are automatically secured for both station and trunk ports; you can accept these default addresses as your secure addresses, or you can replace them. In addition, each board contains a floating cache that allows you to assign an additional 32 secure addresses among the ports of your choosing. Some boards even provide multiple caches; see **Boards with Multiple Caches**, below.

Trunk port security

When locking is enabled, *all* ports will be secured — including natural trunk ports. (Only ports which have been forced to trunk status will remain unlocked.) Before implementing locking on trunk ports, however, be sure you have secured the necessary source addresses; as with station ports, only the first two detected source addresses are secured by default.

For devices with the newest security firmware (3.11.xx), a port's topology status — whether it is considered to be a station port or a trunk port — no longer determines its securability; securability is only determined by the number of source addresses in a port's source address table: any port which detects fewer than 35 source addresses will be locked. Ports which exceed those numbers are designated "unsecurable," and will be displayed as such in the port-level Security window; in addition, a new feature allows you to force any port to an unsecurable (that is, unlockable) state.

If your EMM-E6 is running firmware more recent than 2.00.16 and previous to 3.11.xx, you will not have the ability to force a port to unsecurable status; however, for firmware versions in that range, ports which have been forced to trunk status will not be locked, so you can use the force trunk feature — available from the Hub View port menus — to render a port unsecurable if you wish.

Configurable violation response

Before *LANVIEW* SECURE, any locked port which experienced a violation was shut down automatically; now, you can choose to allow ports to remain enabled even after an unsecured address has attempted to access a locked port. If you choose **not** to disable a port which has experienced a violation, however, the port's only response to an intruder will be to issue a trap after the first violation; all packets, regardless of source address, will be allowed to pass. Ports in this state still have active eavesdropper protection (see definition below), and all packets addressed to any destination *other* than the secured address(es) will be scrambled.

Full or partial security against eavesdropping

In addition to the enhanced intruder protection features described above, *LANVIEW* SECURE provides protection against eavesdroppers by scrambling the data portion of each packet to all ports *except* the port on which the destination address has been secured — in other words, the only port that will receive the packet in an unscrambled (readable) format is the port to which the packet was addressed. Two levels of eavesdropper protection are provided: full security scrambles all packets not specifically destined to the secured port, including broadcasts and multicasts; partial security scrambles only unicast packets.

The Newest *LANVIEW* SECURE Features

Additional *LANVIEW* SECURE features available on the newest firmware versions (3.11.xx) include:

Continuous learning mode

When configuring security on the newest *LANVIEW* SECURE devices, you can now choose between two levels of lock status: **Full** lock status, which behaves as locking has always done, and **Continuous** lock status, which essentially disables intruder protection by allowing the port to continue to learn new source addresses even when in a locked state. In this state, eavesdropper protection is still active, and will adjust so that packets addressed to the *current* learned address for a secured port are not scrambled.

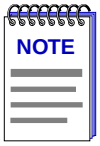
Locking ports from a Source Address window automatically provides Full lock status; however, locking ports from the repeater- or module-level Source Address window does not override any existing Continuous lock status settings.

Forced non-secure status

With the original version of *LANVIEW*SECURE, all ports except those which had been forced to trunk status could be locked, and would be locked automatically if locking were enabled at the repeater or module level. With the enhanced version of *LANVIEW*SECURE, this has changed in two ways: first, any port which has more than 35 addresses in its source address table (or exactly 35 addresses through two consecutive aging times) is automatically considered **unsecurable** and cannot be locked while in this state; and second, you can force any port into this unsecurable state (as long as it is not already locked).

Learned addresses reset

By selecting the **Reset Learned Addresses** option in the repeater-, board-, or port-level Security window, you can clear all learned and secured addresses out of the selected port(s) address table, and allow that port to begin learning (and securing) new addresses. Note that you cannot reset learned addresses on a locked port or on a port which is designated unsecurable.



You cannot reset learned addresses or force non-secure status on a port which is already locked; in order to implement either of those features, you must first unlock the port.

Security on Non-*LANVIEW*SECURE MIMs

*LANVIEW*SECURE features as described above apply in total only to repeater MIMs designated as *LANVIEW*SECURE (as indicated by a label on the front panel and an "S" appended to the module name) and apply only to ports communicating via FNB channels B or C. Some of the enhanced security features, however, will apply to all MIMs installed in your EMM-E6-controlled hub, regardless of their channel assignment or *LANVIEW*SECURE status:

New definitions for station and trunk ports

All ports in your EMM-E6-controlled hub will be defined as station or trunk ports according to the new definitions: station ports are those detecting zero, one, or ***two*** source addresses; trunk ports are those detecting ***three*** or more.

Secure address assignment

Up to two source addresses detected on any *station* port are still automatically secured, and you can still accept or replace these default addresses. However, you cannot assign more than two secure addresses to any port (as there is no floating cache available), and neither natural nor forced trunk ports will ever be locked while in a trunk state.

Configurable violation response

You can still choose to allow ports to remain enabled even after an unsecured address has attempted to access a locked port. If you choose **not** to disable a port which has experienced a violation, however, the port's only response to an intruder will be to issue a trap after the first violation; all packets, regardless of source address, will be allowed to pass.

Forced non-secure status

With the enhanced version of *LANVIEW* SECURE, even ports on non-*LANVIEW* SECURE MIMS can be forced to an **unsecurable** status (as long as they are currently unlocked).

Learned addresses reset

You can still use the **Reset Learned Addresses** option in the repeater-, board-, or port-level Security window to clear all learned and secured addresses out of the selected port(s) address table, and allow that port to begin learning (and securing) new addresses. Note that you cannot reset learned addresses on a locked port or on a port which is designated unsecurable.

Eavesdrop protection (scrambling), trunk port locking, continuous lock mode, and the floating address cache are not available for non-*LANVIEW* SECURE MIMs (A-channel MIMs and non-*LANVIEW* SECURE RIC MIMs) or for any *LANVIEW* SECURE TPXMIM ports configured to operate on Channel A.

Configuring Security

Most Security parameters are set via the port-level Security window; these will apply to the configured port regardless of the level at which security is enabled.

To access the Port Security window:

1. In the Repeater Security window, click to select the interface for which you would like to configure port-level security.
2. Click mouse button 1 on Port Sec; the Channel X Port Security window, Figure 7-2, will appear.

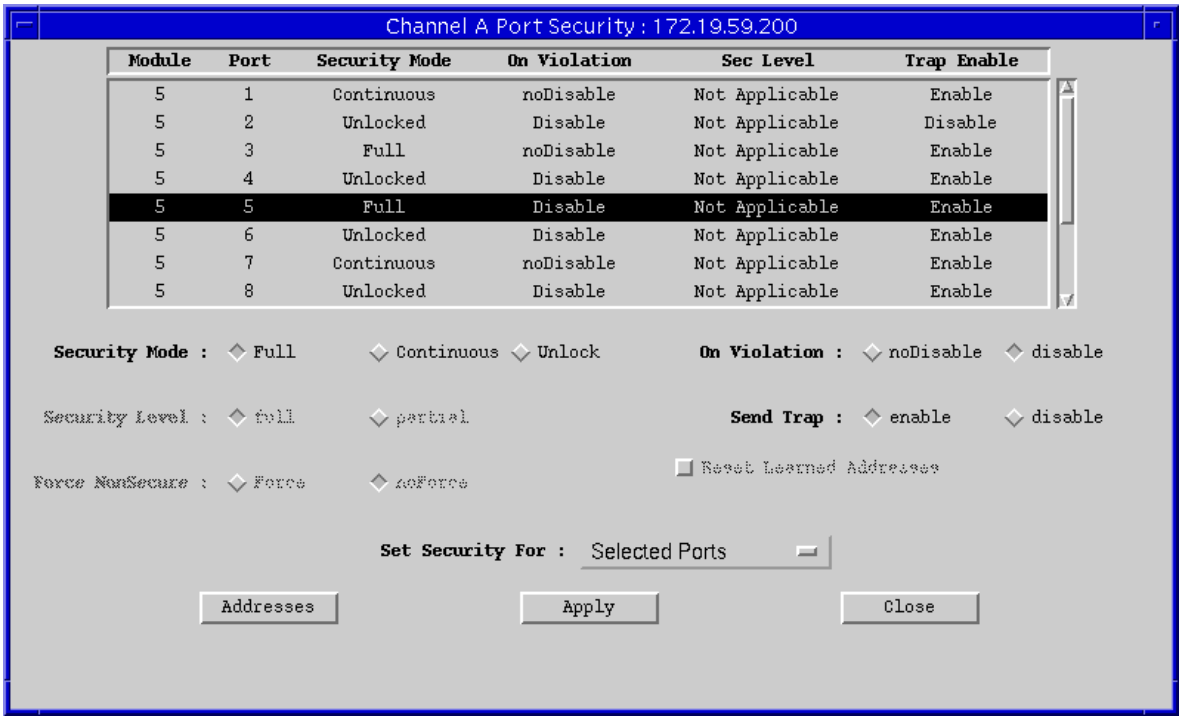


Figure 7-2. Channel X Port Security Window

The top portion of the window contains a list box which displays each port communicating on the selected channel, designated by module and port number. Each port's current Lock Status, violation response, Security Level, and Trap status is also displayed. Note that any ports on a non-*LANVIEW* SECURE MIM or any *LANVIEW* SECURE TPXMIM ports configured to operate on Channel A will display "not applicable" in the Security Level field; eavesdropper protection (scrambling) and continuous lock mode cannot be implemented for these ports. (See **Security on Non-*LANVIEW* SECURE MIMs**, page 7-5, for more information.)

The lower portion of the window provides the fields you need to configure security for one or more of the listed ports. Note that if you select a group of ports with different security capabilities, only those capabilities which apply to every port in the selected group will be active; those which are not available for every port in the selected group will be grayed out.

To configure security levels and violation response:

1. Use the **Set Security For** field or the mouse to select the port or ports for which you wish to configure security (note that the settings in the **Set Security For** field will change automatically as you click to select or de-select ports).

2. In the **On Violation** field, click to select **disable** if you want the port or ports to be disabled if any unauthorized source address is detected, or select **noDisable** if you wish the port to remain operational after a violation. Note that selecting the **noDisable** option effectively removes intruder protection from the selected ports: a trap will be sent after the first violation, but all packets, regardless of source address, will be allowed to pass. Ports in this state still have active eavesdropper protection.

Any ports which are disabled in response to a violation will remain disabled even after the EMM-E6 has been reset, and must be re-enabled manually. See ***Enabling /Disabling MIM Ports*** *in Chapter 2 for more information.*

3. The **Security Level** field allows you to select which packets not addressed to the selected ports will be scrambled: click to select **partial** if you wish to scramble the data portion of all packets *except* broadcasts and multicasts; select **full** if you wish to scramble broadcasts and multicasts as well. Note that scrambling can only be applied to *LANVIEW* SECURE MIMs operating on channels B or C; this field will be grayed out if one or more non-*LANVIEW* SECURE MIM ports has been selected in the list box.
4. Use the **Force NonSecure** field to designate which ports should be securable (that is, lockable) and which should be unsecurable. By definition, any *LANVIEW* SECURE port with more than 35 addresses in its source address table (or exactly 35 for two consecutive aging times) is unsecurable, as are any non-*LANVIEW* SECURE ports with more than 3 addresses (or exactly 3 for two consecutive aging times). Unsecurable ports — whether forced or natural — cannot be locked, and will be designated in the list box as **Unsecurable**.

You cannot force a port to Unsecurable status if it is already locked.

5. Click on Apply to save your changes; the new Security Level and violation response settings will be displayed in the list box.

To assign secure addresses to a port:

1. Click to select a single port in the list box; the Addresses button will be activated.
2. Click on Addresses; the Addresses window, Figure 7-3, will appear.

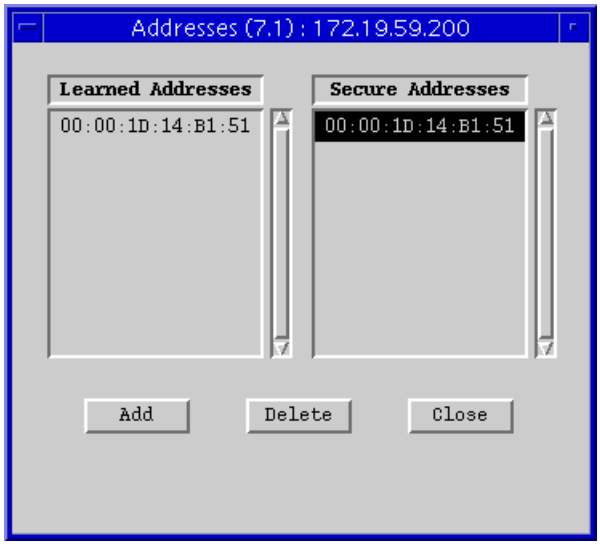


Figure 7-3. The Addresses Window

3. On the left side of the window, the **Learned Addresses** list box will display all source addresses detected by the selected port during the last aging interval (see Chapter 6, **Source Address**, for more information on the aging interval). On the right side of the window, the **Secure Addresses** list box will display the source addresses which have been secured for that port. Remember, as long as the port is in a securable state, the first two addresses detected by the port are automatically secured; you can add additional addresses, or delete the default addresses and secure new ones, as follows:

   a. To add a learned address, click to highlight the desired address in the **Learned Addresses** list box, then click on Add. A confirmation window will appear; click on **Yes** to secure the selected address.

NOTE

*If security has never been enabled, new addresses will **replace** any existing learned addresses. If security has ever been enabled — even if it is not currently enabled — new addresses will be stored **in addition to** any learned addresses.*

   b. To delete a secured address, click in the **Secure Addresses** list box to highlight the address you wish to delete, then click on Delete. A confirmation window will appear; click on **Yes** to delete the address, or **No** to leave the address secured.

   c. To add an address not yet detected by the port, make sure no Learned Addresses are highlighted, then click on Add; the Add MAC Address window, Figure 7-4, will appear.

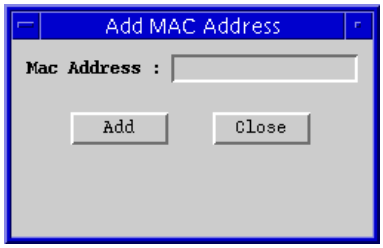


Figure 7-4. Add MAC Address Window

d. Enter the desired MAC address in an xx:xx:xx:xx:xx:xx format, then click on Add. A confirmation window will appear; if you click on **Yes** to secure the address, it will appear in the **Secure Addresses** list box.

4. To secure addresses for additional ports, click to select the desired port in the Channel X Port Security window; the Addresses window will automatically display the Learned and Secure addresses for the new port.

NOTE

*If the maximum number of addresses has already been assigned to the floating cache on the selected board, or if you have already secured two addresses on a non-LANVIEWSECURE MIM port, the **Add** button will be disabled.*

You can clear both Learned and Secure addresses (and re-start the learning process) by using the Reset Learned Addresses option in the repeater-, module-, or port-level Security window; see ***Resetting Learned Addresses**, page 7-11*.

Boards with Multiple Caches

Because of the number of ports they contain, some boards provide two separate floating address caches: one for each bank of ports. In effect, this circumstance allows you to configure as many as 64 additional secure addresses, as long as no more than 32 are configured for each set of ports. For example, the TPR-36S, which has 26 ports, provides one 32-address cache for ports 1-13 and a second cache for ports 14-26; the TPX-22S, which has 22 ports, provides one 32-address cache for ports 1-10, and a second cache for ports 11-22.

NOTE

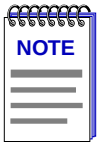
Note that LANVIEWSECURE TPX MIMs assigned wholly to Channel A contain no active cache, as the floating cache feature is not supported for MIMs operating on Channel A. Similarly, you will not be able to assign more than two secure addresses to any TPX MIM port while it is configured to operate on Channel A.

In any case, the Security application will keep track of how many caches are present and how many addresses have been assigned to each, and will disable the **Add** button as appropriate.

Resetting Learned Addresses

You can clear all learned and secured addresses out of a port's address table, and allow that port to begin learning (and securing) new addresses, as follows:

1. In the Repeater Security window, click mouse button 1 on the repeater interface for which you would like to reset learned addresses.
2. Click mouse button 1 on Rptr Sec, Module Sec, or Port Sec to open the appropriate window.
3. In the Module or Port window, click to select the module(s) or port(s) for which you wish to reset learned addresses.



You cannot reset learned addresses for any port which is already locked or in an unsecurable state (either natural or forced). If you select a group of ports which includes one in a locked or unsecurable state, or if you select a module or a repeater which has a port in one of these states, the Reset Learned Addresses option will be unavailable.

4. Click to select the **Reset Learned Addresses** option. A confirmation window will appear; click on OK to reset addresses, or on Cancel to cancel. The port's address table will be cleared of all Learned and Secure addresses, and the learning process will restart.

Tips for Successfully Implementing Eavesdropper Protection

There are a couple of things to note about eavesdropper protection, or scrambling, that must be taken into consideration as you are planning security for your network.

- Security can only be implemented by locking a port, and can only be completely disabled by unlocking the port. You cannot enable intruder protection on a *LANVIEW* SECURE MIM without also enabling eavesdropper protection. You can, however, effectively enable eavesdropper protection alone by selecting the **noDisable** option for the violation response; selecting noDisable basically eliminates intruder protection, as all packets will be allowed to pass regardless of their source address. (Note, however, that the port will issue a trap after the first violation.) You can also enable eavesdropper protection without intruder protection by selecting the Continuous lock mode; see **Enabling Security and Traps**, page 7-12, for details.
- When locking has been enabled for a channel, packets travelling across the inter-RIC bus on the FNB backplane between MIMs operating on that channel will be scrambled to all but the destination port, and security operates as you would expect it to. However, packets are always transmitted clean to the EMM-E6's bridge ports, so any packets transmitted to *another* channel will be

transmitted clean to all ports on that channel unless security has been enabled there, too. Packets bridged to Channel A will always be transmitted clean to all ports, regardless of lock status; however, careful bridge configuration and prudent use of each port's forwarding and blocking abilities can provide some measure of security in this case.

- Security must be disabled on any port which is connected to an *external* bridge, or the bridge will discard all packets it receives as error packets (since the CRC is not recalculated after a packet is scrambled).
- Security should also be disabled on any port which is supporting a trunk connection, unless you are sure that no more than 34 source addresses will attempt to use the port, and you have secured all necessary addresses. Note that, with the newest versions of security, a *LANVIEW* SECURE port that sees more than 35 addresses in its Source Address table (or exactly 35 addresses for two consecutive aging intervals) is considered unsecurable and cannot be locked.
- Full security should not be implemented on any port which supports a name server or a bootp server, as those devices would not receive the broadcast and multicast messages they are designed to respond to (partial security — which does not scramble broadcasts or multicasts — will not affect their operation). Note that users who require responses to broadcast or multicast requests can still operate successfully if their ports are fully secured, as the *reply* to a broadcast has a single, specific destination address.

In general, scrambling is most effective when employed in a single chassis which contains only *LANVIEW* SECURE MIMs operating on channels B and / or C; remember, non-*LANVIEW* SECURE MIMs and any ports operating on Channel A do not support scrambling as part of their security functionality.

Enabling Security and Traps

You can enable or disable all applicable protections by locking or unlocking ports via the repeater, module, or port Security window, as described in the sections below. There are two levels of lock status to choose from: if you select **Full** lock status, the port will stop learning new source addresses, accept packets only from secured source addresses, employ either full or partial eavesdrop protection (as configured), and take the configured steps (send trap and / or disable port) if a violation occurs; if you select **Continuous** lock status, the port will implement the configured level of eavesdrop protection, but continue to learn source addresses and allow all packets to pass, effectively disabling intruder protection.

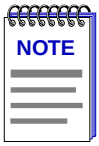
Enabling and disabling traps from the Security windows has the same effect as enabling and disabling them from the Source Address windows; you can enable and disable the following traps:

- A **newSourceAddress** trap is generated when a station port — one receiving packets from zero, one, or two source addresses — receives a packet from a source address that is not currently in its source address table. Information included in this trap includes the board number, port number, and source address associated with the trap. Trunk ports — those receiving packets from three or more source addresses — will not issue newSourceAddress traps.
- A **sourceAddressTimeout** trap is issued anytime a source address is aged out of the Source Address Table due to inactivity. The trap's interesting information includes the board and port index, and the source address that timed out. (See **Setting the Aging Time** in Chapter 6, **Source Addressing**, for more information.)

All other source address traps (portTypeChanged, lockStatusChanged, portSecurityViolation, and portViolationReset, all defined in Chapter 6, **Source Addressing**) will continue to be generated as appropriate, as will the security-specific traps:

- A **secureStateChange** trap indicates that a port has changed from a securable state to an unsecurable state, or vice versa; the interesting information includes board and port index.
- A **learnStateChange** trap indicates that a port has had its learned addresses reset. Interesting information includes board and port index, and current learn state. Note that SPMA always maintains ports in a learn state, and just resets that learn state to achieve a reset of existing learned and secure addresses.
- A **learnModeChange** trap is issued when a port is set to continuous lock mode; interesting information includes board and port index, and current learn mode.

When setting these parameters at the various levels, keep in mind that the most recent setting will override the existing status: for example, if you lock one or more ports at the port level, then unlock them at the module level, all ports on the module will be unlocked. Similarly, if you enable traps at the module level, then disable them at the repeater level, traps will be disabled for all ports on the repeater.



*Enabling and disabling locking from the Source Address application (described in Chapter 6) will implement all applicable security features as they have been configured via the port-level Security window. Note that locking ports from the Source Address window implements **Full** lock status by default; however, this will not override the status of any ports which have already been set to **Continuous** lock mode.*

*Enabling and disabling traps from the Source Address window also has the same effect as enabling or disabling them from the Security application. Keep in mind, however, that SPMA does not accept the trap messages; that task is left to your network management system. (See the appropriate network management system documentation for details about viewing trap messages.) Note, too, that no traps will be sent by the EMM-E6 unless its trap table has been properly configured; see the EMM-E6 hardware manual and/or the **Trap Table** chapter in the* **SPMA Tools Guide** *for more information.*

Repeater-level Security and Traps

Locking ports at the repeater, or channel, level applies all applicable security (as configured via the Port Security window) to every port on the channel.

NOTE

If you select a repeater whose ports have different security capabilities, you may still be able to select and apply security states which are not applicable to all ports. Applying these kinds of settings will have no adverse affect on your network devices: those ports which can accept the set will do so; those which cannot will either ignore the set or issue a Set Failed.

To enable or disable security and traps for all ports on a repeater:

1. In the Repeater Security window, click mouse button 1 on the repeater interface for which you would like to configure port locking and/or traps.
2. Click mouse button 1 on Rptr Sec; the Channel X Security window, Figure 7-5, will appear. Note that the current repeater-level settings are displayed immediately to the right of the field names; a repeater whose ports have different Security Mode or Trap settings will display a status of "Mismatch."

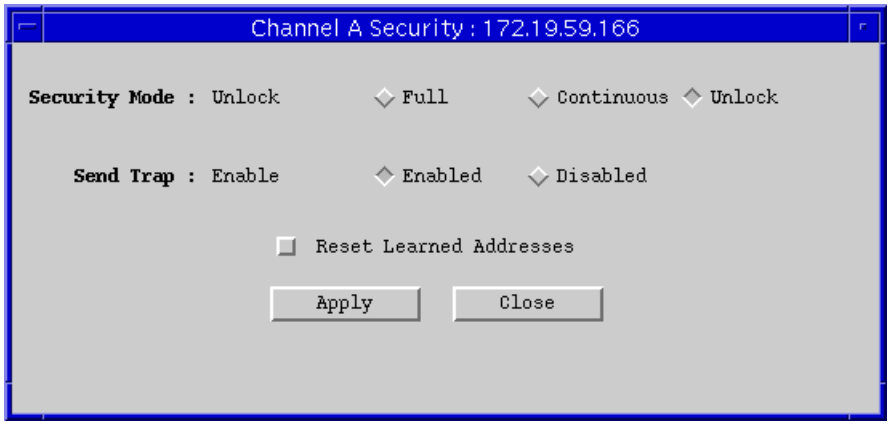


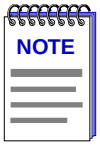
Figure 7-5. Channel X Security Window

3. In the **Security Mode** field, click mouse button 1 on the appropriate selection to apply **Full** or **Continuous** lock status to all ports on the selected repeater channel, or to **Unlock** all ports on the channel. (Note that if your EMM-E6 does not support the newest security enhancements, the **Continuous** selection will be unavailable.)
4. In the **Send Trap** field, click mouse button 1 on the appropriate selection to **Enable** or **Disable** traps for the selected repeater channel.

5. Click mouse button 1 on Apply to save your changes; the new status will be displayed in each field to the right of the field name. Click on Close to exit the window.

Module-level Security and Traps

Locking ports at the module level applies all applicable protections (as configured via the Port Security window) to each port on the selected module or modules.



If you select a group of modules whose ports have different security capabilities, you may still be able to select and apply security states which are not applicable to all ports. Applying these kinds of settings will have no adverse affect on your network devices: those ports which can accept the set will do so; those which cannot will either ignore the set or issue a Set Failed.

Note, too, that if you are configuring locking or traps for a TPXMIM in multi-channel mode, the settings applied via the module window will only apply to those ports communicating on the channel selected in the main Security window.

To enable or disable locking and / or traps at the module level:

1. In the Repeater Security window, click to select the appropriate repeater interface in the scroll list.
2. Click mouse button 1 on Module Sec; the Channel X Module Security window, Figure 7-6, will appear. Note that the current module-level settings are displayed in the list box; a repeater whose ports have different Security Mode or Trap settings will display a status of “Mismatch.”

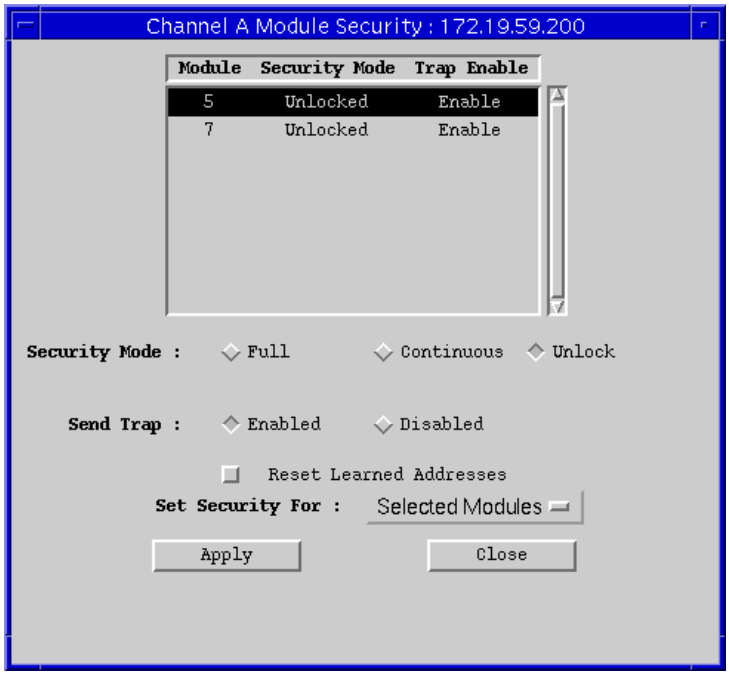


Figure 7-6. Channel X Module Security Window

3. Use the **Set Security For** field or the mouse to select the module or modules for which you wish to configure security (note that the settings in the **Set Security For** field will change automatically as you click to select or de-select modules).

4. In the **Security Mode** field, click mouse button 1 on the appropriate selection to apply **Full** or **Continuous** lock status to all ports on the selected modules, or to **Unlock** all ports on the modules. (Note that if your EMM-E6 does not support the newest security enhancements, the **Continuous** selection will be unavailable.)

5. Click on the appropriate selection in the **Send Trap** field to **Enable** or **Disable** traps for the selected module(s).

6. Click on Apply to save your changes; each module's current status will be displayed in the scroll list. Click on Close to exit the window.

Port-level Security and Traps

To enable or disable security and / or traps at the port level:

1. In the Repeater Security window, click to selected the desired repeater interface, or channel, in the scroll list.
2. Click Port Sec; the Channel X Port Security window, Figure 7-7, will appear.

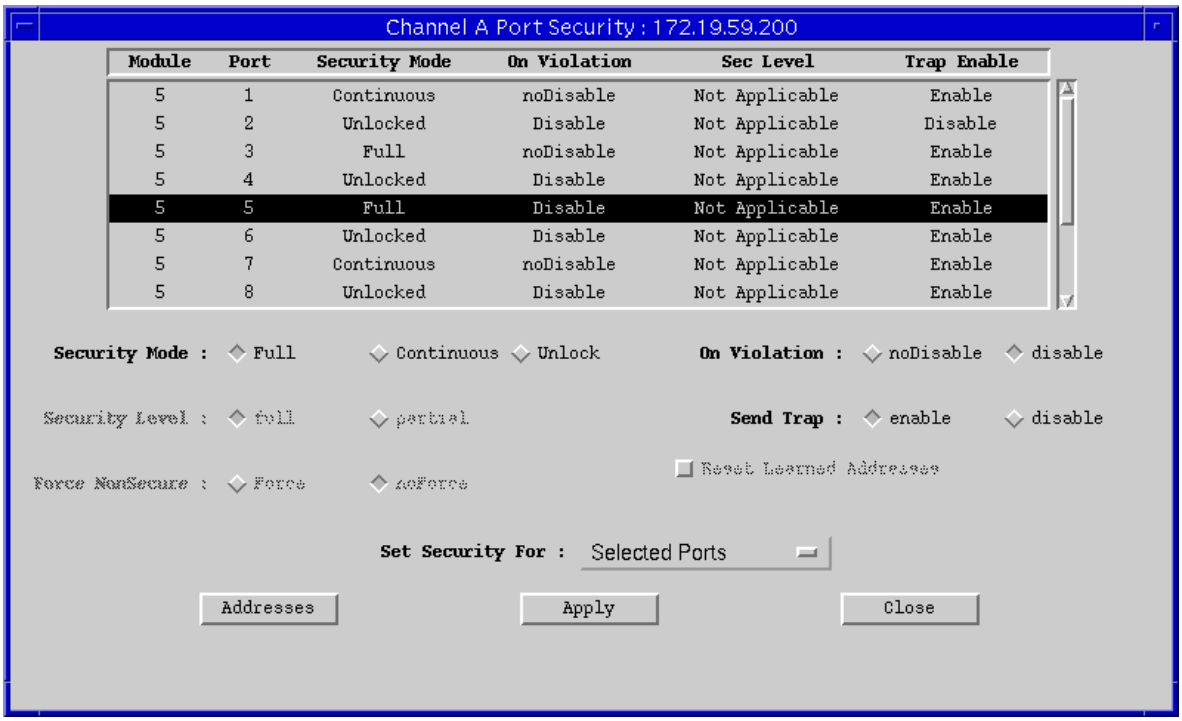


Figure 7-7. Channel X Port Security Window

NOTE

For information on configuring security level, violation response, and secure addresses, see ***Configuring Security****, page 7-6. For information on resetting learned addresses, see* ***Resetting Learned Addresses****, page 7-11.*

3. Use the **Set Security For** field or the mouse to select the port or ports for which you wish to configure security (note that the settings in the **Set Security For** field will change automatically as you click to select or de-select ports).

4. In the **Security Mode** field, click mouse button 1 on the appropriate selection to apply **Full** or **Continuous** lock status to the selected port(s), or to **Unlock** selected ports. (Note that if your EMM-E6 does not support the newest security enhancements, or if the group of ports you have selected includes one on a non-*LANVIEW* SECURE MIM, the **Continuous** selection will be unavailable.)
5. Click on the appropriate selection in the **Send Trap** field to **Enable** or **Disable** traps for the selected port(s).
6. Click on Apply to save your changes; each port's new status will be displayed in the list box. Click on Close to close the window.

Chapter 8

Front Panel Redundancy

This chapter describes setting up front panel redundancy

Setting Front Panel Redundancy

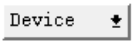
When you configure front panel redundancy, you designate one of the EMM-E6's redundant front panel ports as the active port and the other port as the backup. Once a redundancy scheme has been defined and enabled, the EMM-E6 monitors the active port's connection to up to three designated IP addresses. If the port loses contact with one address, it attempts to make contact with the next address listed for its redundant circuit. If it cannot make contact with any IP address in its circuit, the device switches to the backup port, which has an independent physical connection to the network.

To open the Front Panel Redundancy window

from the icon:

1. Click on the appropriate EMM-E6 icon to display the icon menu.
2. Drag down to **Front Panel Redundancy** and release.

from the Hub View:

1. Click on 

to display the **Device** menu.
2. Drag down to **FP Redundancy** and release.

from the command line (stand-alone mode)

1. From the appropriate directory, type:

```
spmarun fpred <IP address> <community name>
```

NOTES

*The **spmarun** script invoked first in the above command temporarily sets the environment variables SPMA needs to operate; be sure to use this command any time you launch an application from the command line. This script is automatically invoked when you launch an application from the icon menu or from within the Hub View.*

*If you wish to configure a redundant circuit, be sure to use a **community name** with at least Read/Write access. If you only wish to view current settings, a community name with Read access will be sufficient.*

*If there is a hostname mapped to your EMM-E6's IP address, you can use **<hostname>** in place of **<IP address>** to launch this application. Please note, however, that the hostname is **not** the same as the device name which can be assigned via Local Management and/or SPMA; you cannot use the device name in place of the IP address.*

The Front Panel Redundancy window, Figure 8-1, will appear.

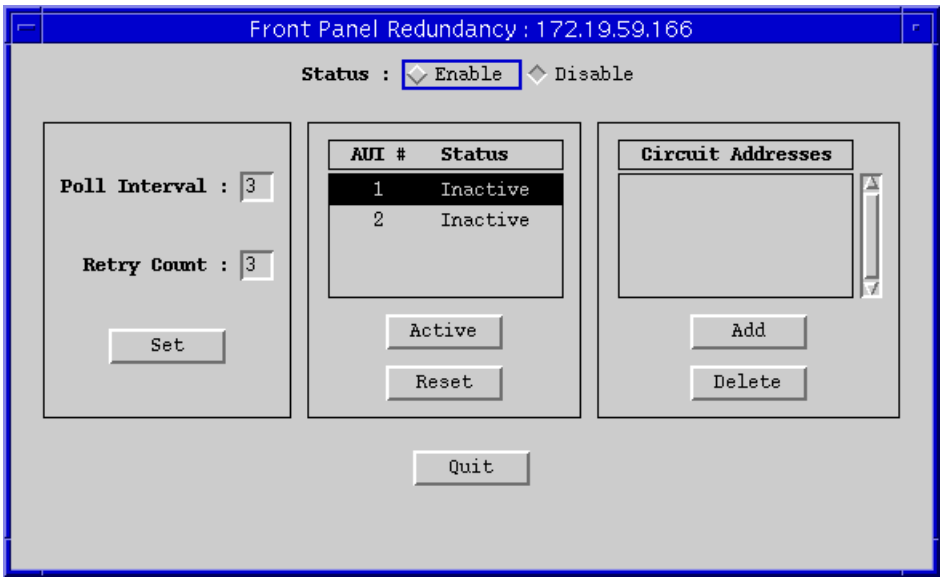


Figure 8-1. Front Panel Redundancy Window

Configuring a Redundant Circuit

To configure a redundant circuit for the front panel:

NOTE

*Make sure that the **Disable** option at the top of the window is selected; front panel redundancy must be disabled when you edit redundancy settings.*

1. Use mouse button 1 to highlight a port, either **AUI #1** or **AUI #2**.
2. Click on Add to access the Add Circuit Address window, Figure 8-2.

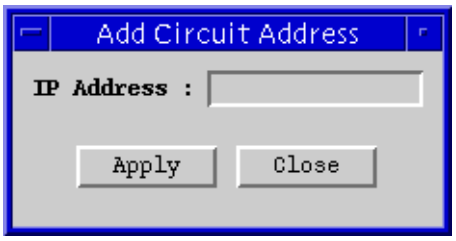


Figure 8-2. Add Circuit Address Window

3. In the Add Circuit Address window, enter the IP Address of a network device and then click Apply. Once the circuit is enabled, the device monitors its link with the specified IP address. If you add more than one address, the redundancy test checks the connection status of *each* address, in the order they were entered. You can add up to three addresses which will be used to check link status; be sure to click on Apply after entering each address.
4. Highlight the second AUI port and repeat step 3.
5. To designate one port as the Active port, highlight the AUI port number and click the **Active** button. Only one port can be active at any one time; activating one port automatically deactivates the other port.
6. You can edit the **Poll Interval** timer and **Retry Count** and enable the new settings with the **Set** button. **Poll Interval** specifies the time, in seconds, that the device waits between polls of an IP address listed in the Circuit Addresses box. The **Retry Count** specifies the number of times the device will poll an address before it gives up and begins polling the next address in the circuit.
7. When you have set all configuration settings, click Close.

NOTE

*To clear all Front Panel Redundancy settings, click the **Reset** button.*

Appendix A

EMM-E6 MIB Structure

EMM-E6 management information base configuration

IETF MIB Support

In addition to its proprietary features, the EMM-E6 currently supports the following IETF MIBs:

- RFC 1213 MIB for Network Management of TCP / IP-based Internets: MIB-II
- RFC 1271 Remote Network Monitoring MIB
- RFC 1493 Definitions of Managed Objects for Bridges

EMM-E6 MIB Structure

Cabletron's newer intelligent devices — like the EMM-E6 — organize MIB data into a series of "components." A MIB component is a logical grouping of MIB data, and each group controls a defined set of objects. For example, EMM-E6 bridging information is organized into its own component; repeater information resides in three separate components, one for each of the EMM-E6's internal repeating channels. (Channel D, the front panel connection, and channels E and F, the BRIM connections, do not function as repeaters.)

MIB components give you broad flexibility to customize MIB access according to the needs of your organization, as each component can have its own set of Read Only, Read / Write, and Superuser community names. The Community Names tool lets you quickly view and change community names for any MIB component; it also allows you to selectively enable or disable individual MIB components based on your specific needs. See the **Community Names** chapter in the ***SPMA Tools Guide*** and **A Brief Word About MIB Components and Community Names**, below, for more information.

MIB Components

The EMM-E6 MIB components are described below. Note, however, that at any given time the component list displayed by your EMM-E6 may not include some of the components described below, since the EMM-E6 has the ability to alter the components which make up its MIB in response to changes in the chassis. For example, if you are using only two of the EMM-E6's three internal repeating channels, you will see only two **Repeater** components listed; if, at any time, you add the third channel, the necessary MIB component will automatically appear in the chCompTable. Similarly, if you have an unmanageable MIM (such as a Token Ring MIM) installed in your EMM-E6-controlled hub, you will see the **NoMgmtMIMs** MIB component listed; this component will not appear if the EMM-E6 can manage all of the MIMs installed in your hub. To see which MIB components are currently being used in your EMM-E6, bring up the Community Names application, or use any SNMP Get operation that will allow you to view the contents of the chCompTable.

The EMM-E6 MIB consists of the following components:

Chassis MGR

The Chassis MGR MIB component contains most of the basic information about the EMM-E6, the chassis it is controlling, and the other modules installed in that chassis, including: chassis type, backplane type, number of slots, which module types and names are installed in which slots, the EMM-E6's MIB component information (in the chCompTable), device and module names, hardware revision numbers, MAC and IP addresses, the current time and date, and information related to redundancy, alarms, connected uninterruptable power supplies, and TFTP download. The system, interfaces, at, ip, icmp, udp, and snmp groups from MIB-II are also included. The community names assigned to this MIB component provide the gateway that all SPMA applications use to access all information in the other components, even if those components have different community names; the Chassis MGR community names are the same as those assigned via Local Management.

LIM

The EMM-E6 LIM, or Local Management, component contains the objects that provide out-of-band management via the Console port on the EMM-E6's front panel. No objects from this component are used for remote management; however, you can access the EMM-E6's Local Management via the SPMA Telnet tool, described in the ***SPMA Tools Guide***.

Repeater One, Repeater Two, and Repeater Three

The Repeater MIB components control all repeater functionality on the EMM-E6's three internal repeater channels: A, B, and C. These functions include port count, port enable / disable, port status, board number, repeater statistics (packets, bytes, collisions, errors, etc.), protocol counts, and frame sizes; also included are the alarm, redundancy, source addressing, and trap functions. Note that the default community names for the Repeater MIB components will always be different both from one another and from the default names assigned to all the other components; note, too, that no repeater component may *ever* share a community name with any other repeater component on the same device.

Ctron Use Only

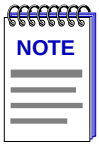
This MIB component is not user accessible, and contains no information required by SPMA or any other remote management application.

FDDI SMT

The FDDI SMT (Station ManagemenT) MIB component contains the objects that allow the FDDI BRIM port to function as a station on the FDDI ring, including information regarding connection policy, configuration, T-Req and T-Neg values, the TVX timer value, duplicate address testing, frame status, version IDs, and upstream neighbor addresses.

ATM_MIB

The ATM_MIB component contains the objects that provide the ATM BRIM port with its network functionality.



Each installed BRIM module will bring its own MIB component(s); as additional BRIM modules are released, you will note other MIB components which contain the OIDs related to the BRIMs' transmission methods and other functionality.

Host Services

The Host Services MIB component contains the objects that provide the EMM-E6 with its IP functionality — essentially, those functions which allow the EMM-E6 to operate over a network — including functions such as ping, Telnet, and TFTP.

IP Services

Like the Host Services MIB component, the IP Services MIB component contains some objects related to basic IP functionality. In addition, if you have purchased and installed routing capability for the EMM-E6, this component contains the objects related to that routing functionality, including router, interface, and component status and administrative information; specific routing components related to each applicable routing protocol (IP Router Event Log, IPX Address Table, DECNet System Configuration, etc.); and a variety of routing-related performance statistics.

Distributed LAN Monitor

The Distributed LAN Monitor, or DLM, MIB component is a proprietary feature that allows you to delegate a management station's polling responsibilities to one or more strategically placed "smart hub" devices — like an EMM-E6 — on your network, reducing overall network SNMP traffic by reducing the number of devices reporting directly to your management station.

MIB Navigator

The MIB Navigator component provides a command set from which you can configure and manage your EMM-E6 by telnetting directly into the device and viewing and modifying the objects in the device's MIB. The MIB Navigator is accessible through SPMA via the Telnet application; see the ***SPMA Tools Guide*** and / or your EMM-E6 hardware manual for more information.

RMON Default

The RMON, or Remote Network Monitoring, Default MIB component contains the statistics, history, alarm, and event groups from the RMON MIB (RFC 1271). This component is shipped in an inactive state, and can be activated and deactivated as necessary.

RMON Host

The RMON Host MIB component contains the host, hostTopN, and matrix groups from the RMON MIB. These groups are contained in a separate MIB component because they require a large proportion of a device's RAM and CPU resources; this component is shipped in an inactive state, and can be activated and deactivated as necessary.

Transparent Bridge

The Transparent Bridge MIB component controls all of the EMM-E6's bridging functions, including bridge port description and status, bridging statistics (frames forwarded, frames blocked, etc.), and bridge configuration information.

NoMgmtMIMs

If you have an unmanageable MIM (such as a token ring MIM) installed in your EMM-E6-controlled hub, the NoMgmtMIMs MIB component provides the EMM-E6 with enough information so that the MIM can be represented in the Hub View with its type and the designation "No Mgt" displayed.

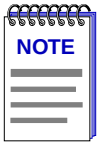
Orphan MIMs

The Orphan MIMs MIB component provides minimal management for any repeater MIMs (RMIMs) installed in the EMM-E6-controlled hub that are configured for operation in stand-alone (isolated) mode.

A Brief Word About MIB Components and Community Names

As mentioned above, the arrangement of the EMM-E6's MIB into a series of components provides a tremendous amount of flexibility in controlling access to the EMM-E6's configuration and statistical information, since each MIB component can have its own unique set of community names, and each can be individually enabled and disabled depending on your management needs (see the **Community Names** chapter in the ***SPMA Tools Guide*** for more information).

All of the SPMA applications can handle these differences in community names internally, with no special actions required on the part of the user; just be sure you define your device icon (or, when operating in stand-alone mode, launch each application) with the appropriate community name from the Chassis MGR MIB component, and SPMA can access all of the information it needs.



The set of community names you assign via Local Management are those which apply to the Chassis MGR MIB component.

However, some of the tools available through your network management platform may require a community name specific to the component which contains the information you are trying to display and / or change. Be sure to consult your ***Installing and Using...*** guide for details; the MIB component descriptions provided above will serve as a roadmap for determining where the information you're interested in is located.

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